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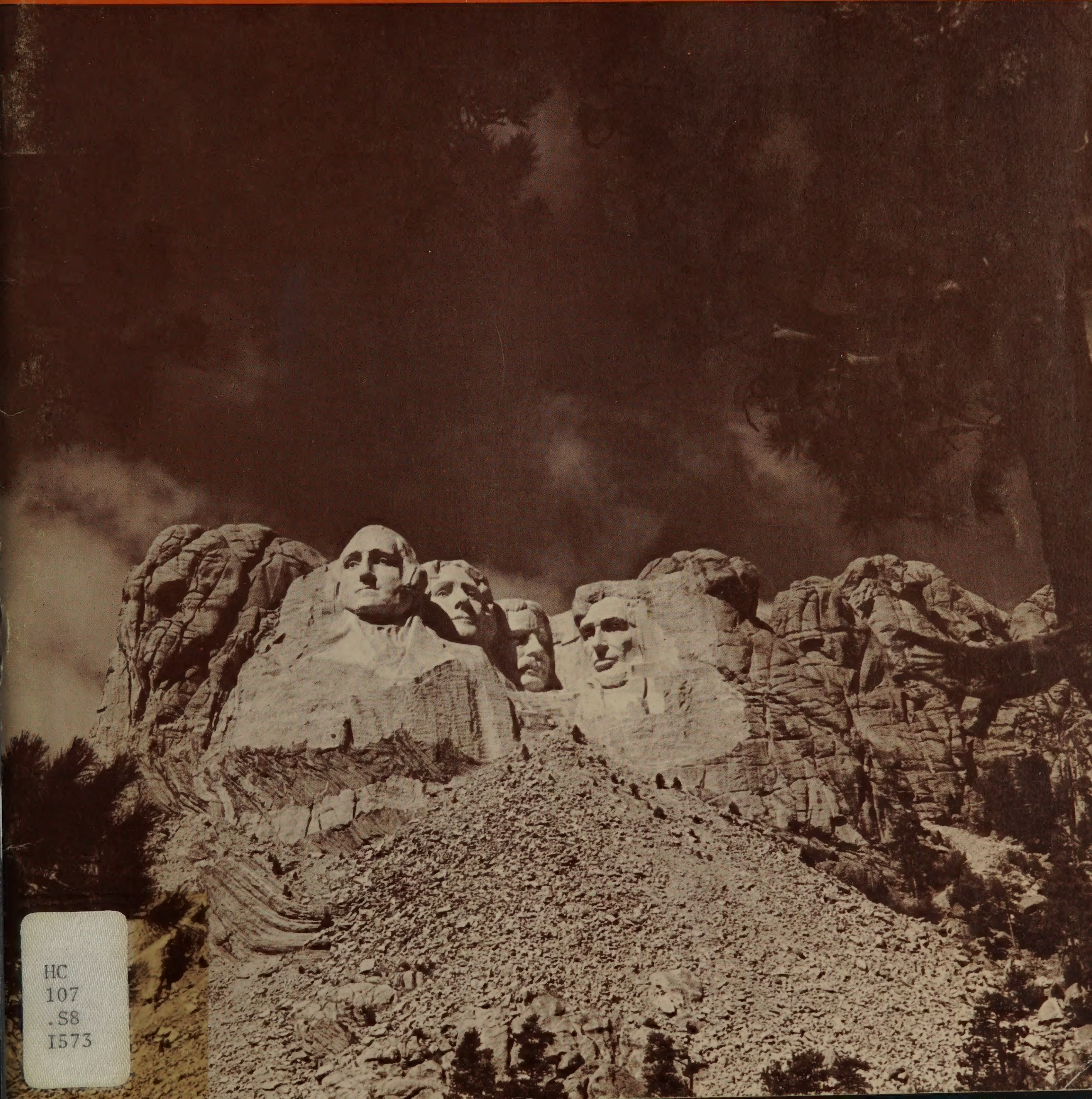

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(Above) Good fishing and pleasant recreation areas in South Dakota are inviting to tourists. (Front cover) The stone likenesses of Washington, Jefferson, Roosevelt, and Lincoln project grandly from Mount Rushmore.

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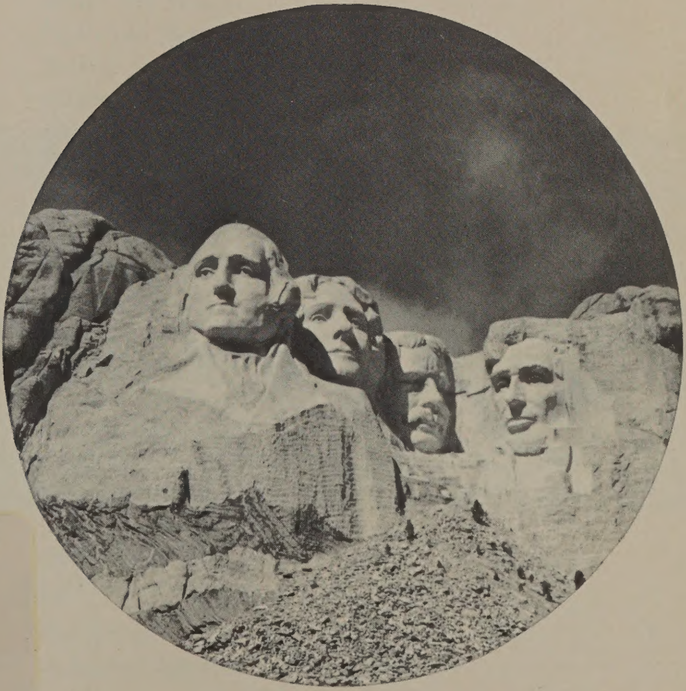

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The purpose of this booklet is to bring a new awareness on the part of the American people of our rich natural resource heritage, its history, its present, and its future. To know our land is to love it and cherish it and protect it from the ravages both of nature and man.

Stewart L Udall

Secretary of the Interior.

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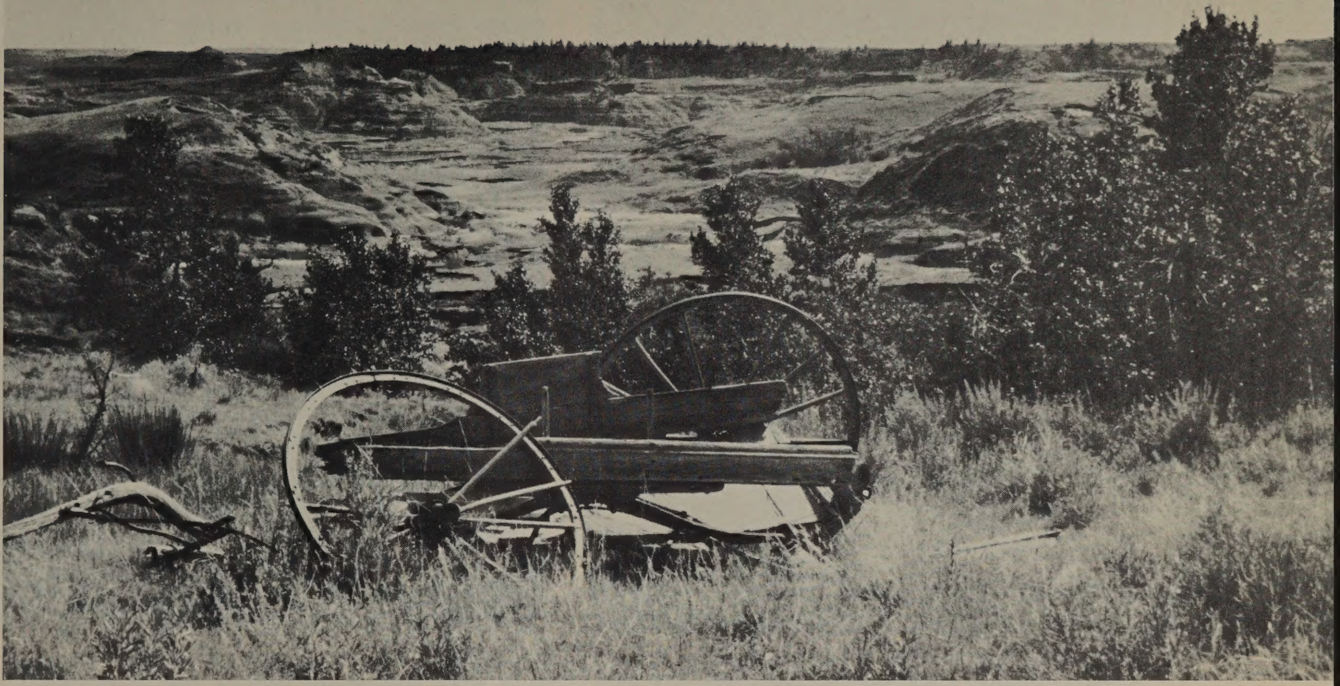
Past and present weave a colorful pattern for South Dakota



Past and present share the stage in South Dakota—from the historical remains of Gold Rush days and Indian battles to the modern developments in agriculture and industry. Current progress is enriched by the flavor of yesteryear.

Introduction

The name Dakota comes from a Sioux Indian word, Dacotah, which means "an alliance of friends." From its three nicknames—the Sunshine State, the Blizzard State, and the Coyote State—to the many figures whose history and legend are woven into its texture—Crazy Horse, Sitting Bull, and Red Cloud, General Custer, Calamity Jane, and Wild Bill Hickok—South Dakota truly embodies its description as the "land of infinite variety."

The juxtaposition of Indian burial grounds and modern cities, explorers' routes and super highways, agricultural success and mining wealth, further suggests a blending of the past and present and reminds one that the pioneer spirit is still very present in South Dakota.

Early Dwellers

South Dakota was part of the large land area known as the Dakota Territory until 1889—but its history reaches back far before statehood. An archeologist's delight, it was inhabited as early as 5,000 B.C. by the aboriginal people who first inhabited the North American continent as well as by the much-earlier dinosaurs whose fossil remains are still being uncovered. The earliest historical inhabitants of the State were the Arikara, or Ree Indians, who preceded the arrival of many later tribes including the Sioux.

Anthropologists speak with respect of the Sioux as exemplars par excellence of Plains Indian culture. Most prominent among the Indians in South Dakota's history, these Sioux were highly skilled horsemen and warriors, and their exploits and battles are indelibly stamped upon the State's history.

An early map of the South Dakota country shows a trail from the mouth of the Wisconsin River along the northern boundary of Iowa via Spirit Lake to Sioux Falls. This trail, the Chemin des Voyageurs, or Trail of the Voyagers, reveals the presence of explorers as early as 1700. Until 1763 the middle Missouri Valley which South Dakota embraces was part of the French Colonial Empire. Pierre Gaultier de Varennes, or La Verendrye, explored the region in 1743, hoping to find the Great Western Sea. His sons later penetrated as far west as Bear Butte, claimed for France a region which now contains five States, and learned that the Missouri River flows southward towards the Gulf of Mexico and guessed that it probably has no western outlet. The land claim is attested to by an inscribed lead plate, buried for 170 years, which is now placed in the South Dakota State Historical Museum at Pierre.

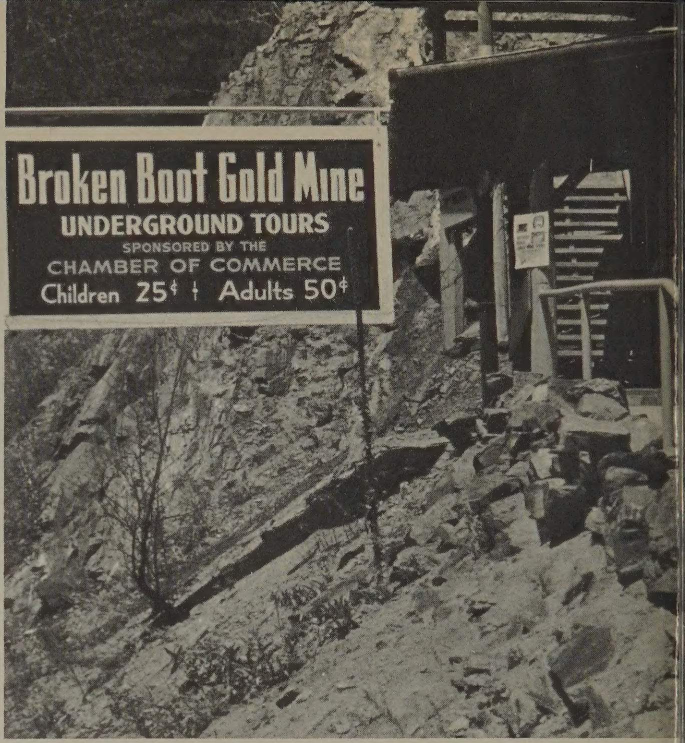
Changing Ownership

Under the Treaty of Paris of 1763, following the French and Indian War, France ceded her possessions west of the Mississippi to Spain. British traders, interested in the pelts and furs which could be gained from bottomlands of the Missouri River, followed the course of the La Verendrye brothers, competing for profits with the Spanish traders and threatening Spanish sovereignty of the region as well.

France reclaimed Louisiana under Napoleon but held the land only 3 years before selling it to the United States in 1803. The next year President Thomas Jefferson dispatched Meriwether Lewis and William Clark on an expedition to explore the uncharted region west of the Mississippi River. The two men journeyed up the Missouri and met the Sioux and Arikara Indians in the course of their travels. Even then, the explorers sensed the necessity of negotiating with the Indians to insure peace within the region and greater freedom of passage for fur traders along the river.

Appeal of the Frontier

The pioneer spirit, the lure of new land and prosperous trading, the challenge of the frontier—all these brought settlers to the Upper Missouri Basin to stay. The first attempt at permanent settlement by agricultural pioneers was made in 1856 by a party from Minnesota which settled at the falls of the Sioux River. In the next 5 years, several settlements were attempted in the southeast corner of present-day South Dakota, but Indian hostility drove most of the homesteaders away, leaving only abandoned homes and villages.



Broken Boot Gold Mine, near Lead, is a remnant of the boom which lured settlers from the East in the 1880's.

In 1861 the land was formally named by Congress as the Dakota Territory, and Yankton was designated as the territorial capital of the area. This included what is now North and South Dakota, Montana, the northern two-thirds of Wyoming, and part of Nebraska. Settlement continued in earnest over the following years, for the fertile lands of the Missouri River bottom between the Vermillion and the James Rivers attracted homesteaders. Droughts, crop failures, more Indian uprisings, and grasshopper plagues, however, discouraged all but the hardiest people, who stayed despite the adversities of frontier life.

The Cry: Gold!

Because the Dakota Territory was on the route to the gold trails of Montana, many sought their fortunes farther west, preferring the lure of gold to the call of the plow. On August 2, 1875, however, one of the most important events in South Dakota's history occurred. A military expedition, led by Gen-

JOHN R. WILSON
Born Sept 2 1869
Died Jan 4 1898

In the rough-and-tough mining days at Deadwood, a man was lucky to have even a pine slab to mark his grave.

eral George Armstrong Custer, found "gold in them thar hills."

The discovery helped to shape Dakota's history. From that moment on, in spite of the attempt to protect the territory of the Indians, a steady flow of prospectors, fortune hunters, and miners brought the "Great Dakota Boom" and the settlement of most of South Dakota. The gold was located deep in the Indian territory of the Black Hills, and the Indians refused to surrender, rent, or sell their sacred land to the gold-hungry white men. Tension between prospectors and Indians led to the Sioux War of 1876, in which Crazy Horse defeated General Custer in the famous Battle of the Little Bighorn. A year later, after Crazy Horse died and the Indians' resistence diminished, they reluctantly ceded the Black Hills to the white intruders.

The peak of the Gold Rush came on the heels of the agreement. New towns—Custer City, Deadwood, Lead—sprang up practically overnight in the rush to the Hills. The famous Homestake Lode of gold-laden quartz was discovered and became the most prosperous mine of the rush. Still the backbone of South Dakota's mining industry, Homestake is the largest gold mine in the Western Hemisphere, producing over $20 million of gold every year.

Favorable weather, excellent soil, increasing access to markets provided by new railroads, and improvements in farm machinery contributed to the Dakota boom, encouraging more and more settlers. Norwegians, Swedes, Danes, Hollanders, Bohemians, Germans, and German-Russians migrated to Dakota to till the land or to tap the new mineral wealth—tin, silver, and mica—also discovered in the search for gold.

Cattlemen from Wyoming, Nebraska, and Texas were attracted to the Dakota Territory because the influx of people created a need for meat and dairy products. In addition, the reduction of buffalo herds—caused by ceaseless plundering of hunters seeking buffalo robes, and leading to Indian acceptance of Federal assigned reservations—opened up more land for grazing cattle. Thus by the late 1880's the population of the land that is now South Dakota was nearly 27,000, contrasted with the 12,000 people who had lived there in 1870 . . . and the demand for statehood filled the air.

Statehood

The move for statehood was a bitter political struggle in the State's history. Disagreement over the location of the territorial capital at

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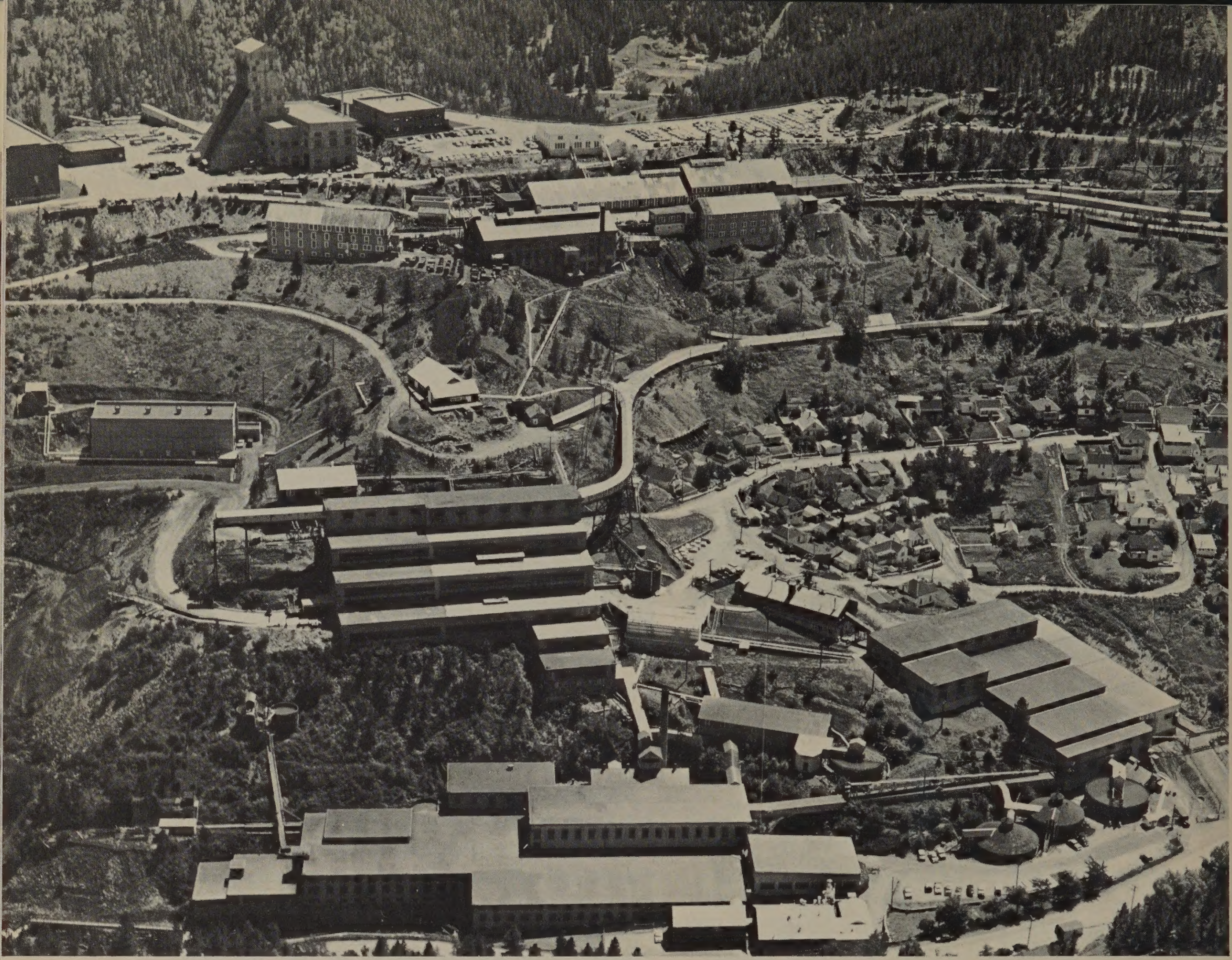


Homestake Mine, the largest gold mine in the Western hemisphere, sprawls grandly over the hilly terrain near Lead.

Yankton had resulted in its relocation to Bismarck. Because the new capital was so far north, one faction sought the separation of the Dakota Territory into two States, while another faction, composed mostly of northerners, was equally determined to see the whole Territory as one State. The northern sentiment for single statehood probably grew out of a fear that statehood for the southern half alone would doom the northern part to territorial status indefinitely. When dual statehood was assured, the issue was cleared, and the bid for statehood was resolved in 1889—first by the Omnibus Bill which defined the new States of North and South Dakota, Washington, and Montana, and later by actual granting of statehood by Congress.

In order not to give priority to either North or South Dakota, but to admit them as equal "sister States," separate proclamations of statehood were placed on President Harrison's desk with only the signature lines showing. Thus no one knew the order in which the States were formally admitted to the Union! It can only be said that the two Dakotas, admitted on November 2, 1889, are the 39th and 40th States. When it is necessary to rank the States by admission, North Dakota comes first, by alphabetical position.

The capital, Pierre, was designated when South Dakota achieved statehood.

South Dakota Today

South Dakota has always been proud of her citizens' interest in the State and its government.

Ample grazing lands account for the substantial contribution of sheep and wool industries to the State's economy.

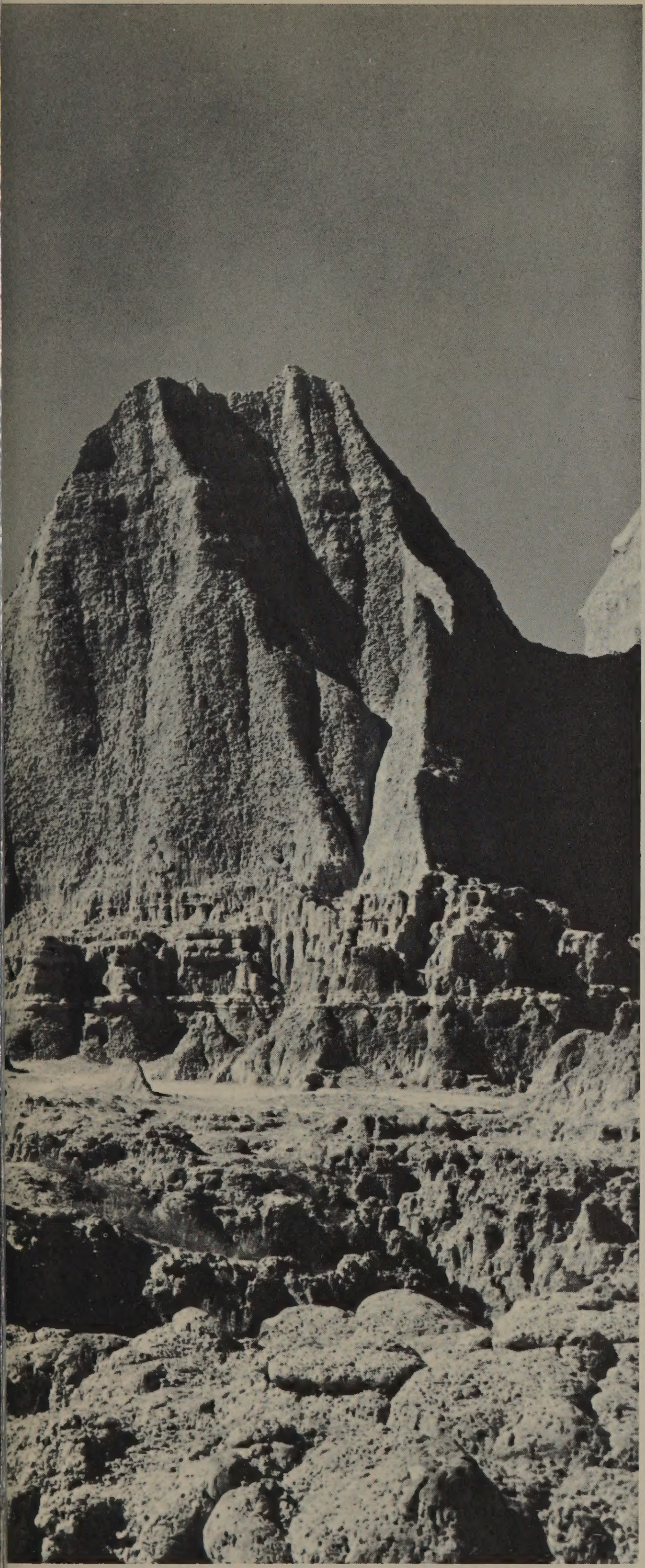
The State motto, "Under God the People Rule," is indicative of their feeling. South Dakota was the first State in the Union to provide by statute for initiative and referendum.

Today, South Dakota with about 700,000 people ranks 40th among the States in population. Agriculture accounts for the principal economic interests, with livestock and livestock products supplying the major portion of the State's income, followed by grain crops. The State is ninth in cattle and calves production in the United States and the fourth leading producer of hard durum wheat.

Though not the primary economic support, the mineral industry is important to South Dakota's economy. In addition to gold, granite, feldspar, gypsum, mica, bentonite, beryllium, uranium, lithium, and limestone are extracted from the "richest 100 square miles on earth"—the Black Hills. Industrial progress can be noted in the construction on the Missouri River of four huge dams which harness the power, irrigation, navigation, and flood control potentials of this great river in South Dakota.

Indicative of South Dakota's variety is its increasing tourist industry, second economically only to agriculture. The scenic and historic areas, the lake resorts, and the abundant supply of pheasants and other wild game for hunting attract millions of visitors to the State each year.

South Dakota's principal cities are Sioux Falls and Mitchell in the southeast, Aberdeen and Watertown in the northeast, Rapid City in the west, Huron in the east-central part, and Pierre, the capital, near the center of the State.



(Left) The austere formations of the Badlands, carved by wind and water erosion, create awesome silhouettes against the sky. (Above) Irrigation reclaims land for more successful field and vegetable crop production.

Physical Characteristics

South Dakota is located in the geographical center of the North American continent, equidistant from the Atlantic and Pacific Oceans, and midway between the North Pole and the equator. Lying in the north-central part of the United States and nearly rectangular in shape, South Dakota, the sixteenth largest State, is approximately 380 miles from east to west and 200 miles from north to south. It is cut irregularly through the center from north to south by the Missouri River. Of its total area of more than 77,000 square miles, about 511 are in rivers and lakes.

South Dakota is bounded by North Dakota on the north, Montana and Wyoming on the west, Nebraska on the south, and Iowa and Minnesota on the east. Most of the State lies within the physiographic divisions of the Great Plains Province and a smaller part of it is in the Central Lowlands Province.

The Missouri River, formed by a glacier, flows through a deep and narrow plain, seldom

(Above) Stands of pine punctuate rolling terrain on the edges of the Black Hills. (Right) Stockade Lake, one of many serene mountain lakes scattered through the Black Hills National Forest, offers a contrast to the urban pace.

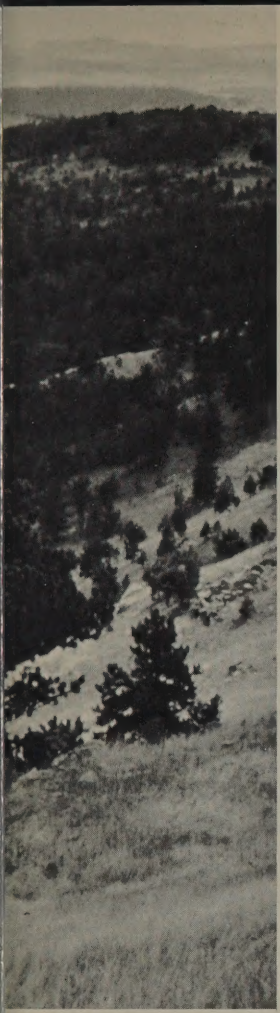
more than two miles wide. East of the River is largely flat prairie, land that is tilled. In the northeast are many lakes lying among glacier-created hills. West of the Missouri River is rolling grassland cut by the Grand, Moreau, Cheyenne, Bad, and White Rivers, which flow generally eastward to the Missouri.

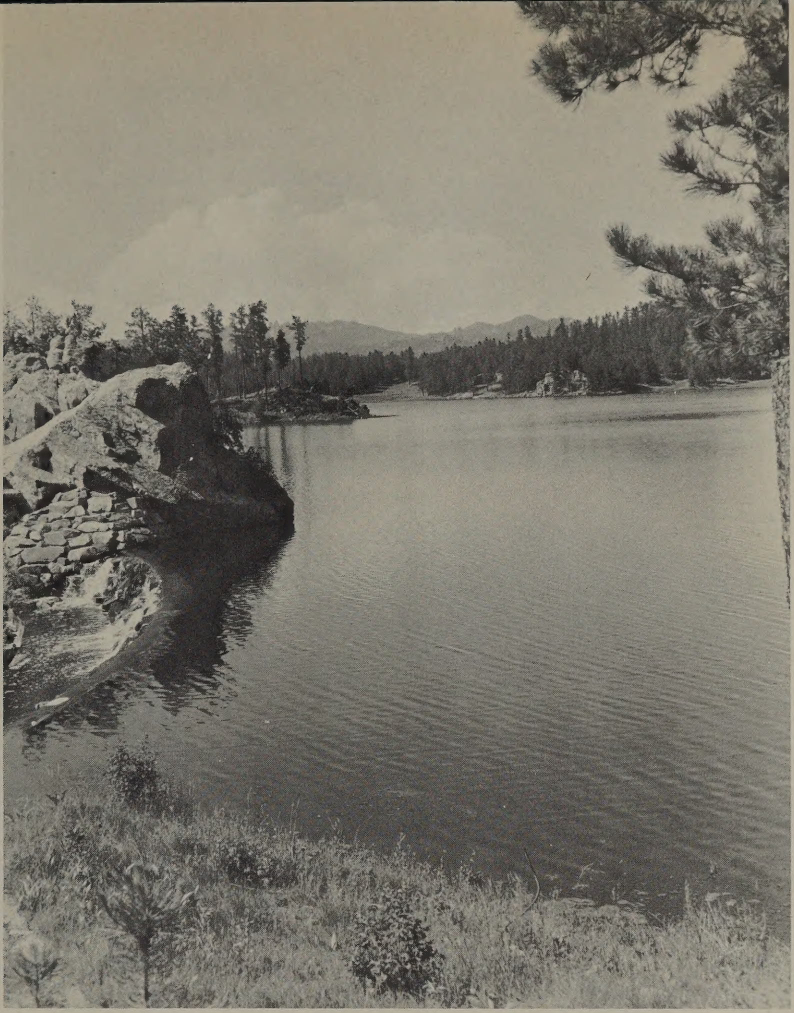
On either side of the White River and north to the South Fork of the Cheyenne are the Badlands, noted for grotesque and picturesque erosion forms and fossils of prehistoric animals. Along the State's western boundary are the tree-clad Black Hills, which reach their highest elevation in 7,240-foot Harney Peak, the highest point in the United States east of the Rocky Mountains.

Three geologic forces—glaciation, erosion, and uplift—produced a varied topography in South Dakota, characterized by lakes, rolling plains, butted and jagged peaks, and, in the east, the fertile valley of the James River.

Geologic Sketch

Most of the mean surface rocks of South Dakota are sedimentary rocks, largely limestone, dolomite, sandstone, and shale, with minor amounts of bentonite, claystone, gypsum, anhydrite, and salt. The sediments that formed these rocks were deposited either on land or in shallow seas whose depths probably were never much greater than a few hundred feet. Because of more or less continuous subsidence or downwarping of the sea floor, at least 15,000 feet of sediment accumulated in what is now known as the Williston basin. The basin, one of the largest structural and sedimentary basins in North America, underlies approximately 200,000 square





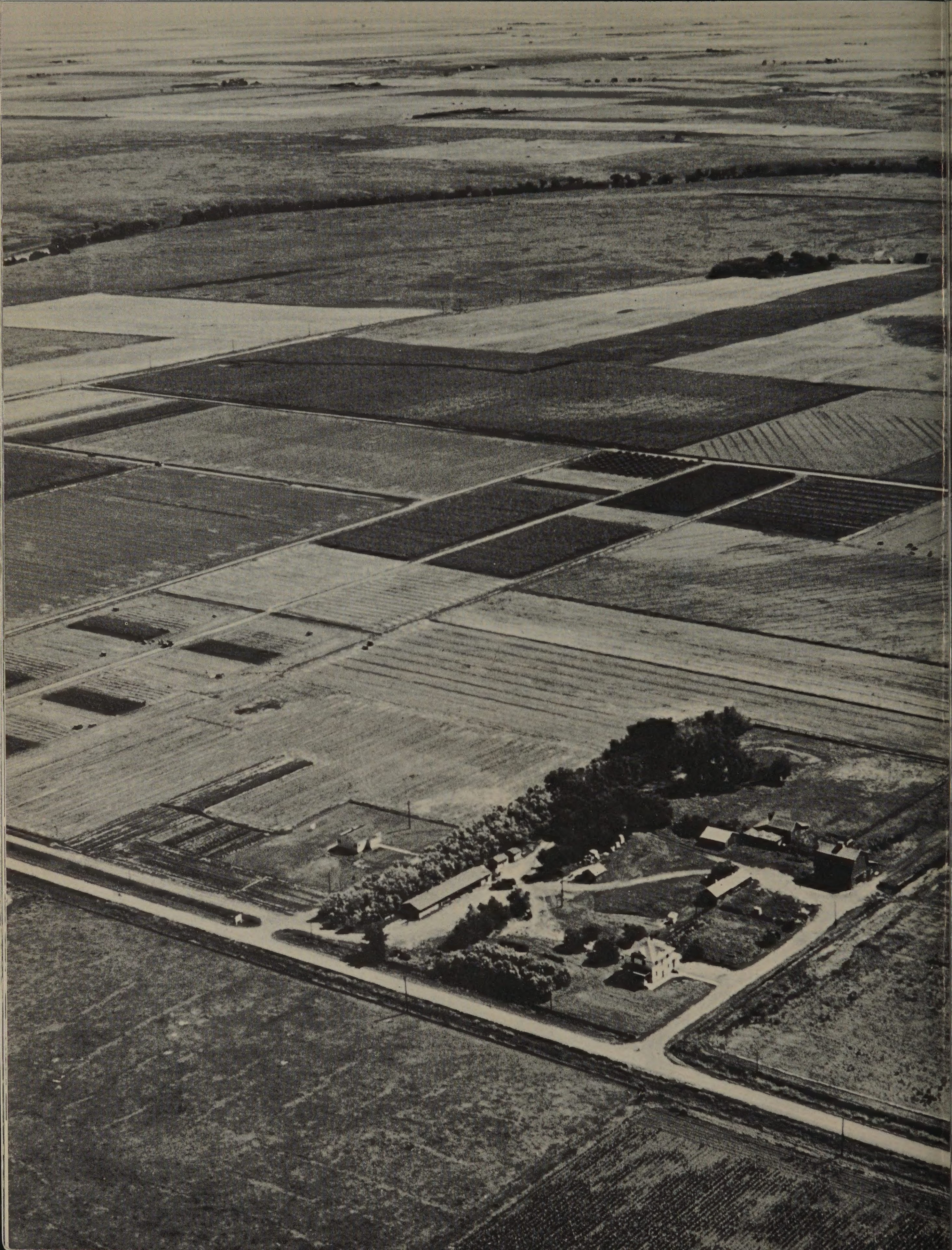
miles in parts of South Dakota, Montana, North Dakota, Saskatchewan, and Manitoba. Sioux quartzite underlies more than 2,000 square miles of glacial drift in southeastern South Dakota.

At about the time seas retreated from western North America, warping of the earth's crust along the western part of the old seaway formed the Rocky Mountains. Far to the east, in what is now western South Dakota, a similar folding and uplifting, on a very much smaller scale, formed the Black Hills. As the Black Hills dome was formed, erosion actively attacked the soft shales and finally the harder and older sediments.

During the latest periods of geologic time in South Dakota, advances and retreats of large continental ice sheets deposited an average of about 40 feet and as much as 700 feet of glacial drift and outwash across that part of the State east of the Missouri River, thus providing the extensive farmlands of eastern South Dakota with a fertile soil which has contributed much to the wealth and productivity of the State.

Climate

South Dakota has a varied climate to match its unique arrangement of geographical features. Because of its great distance from any large body of water, the State has a continental climate, with extremes of summer heat and winter cold. Daily, monthly, and annual temperature ranges are great. Temperatures of 100 degrees Fahrenheit or higher are common in some parts of the State each summer, and below zero temperatures occur frequently in midwinter. The average annual temperature is about 46 degrees. However, the low relative humidity and the high terrain contribute to a more moderate climate than temperatures would indicate. South Dakota can truly claim to be the "Sunshine State."



(Left) Cultivated soil on Redfield Development Farm, transformed by irrigation, creates a patchwork effect.

Land and Forests

The rolling plains comprising most of South Dakota were originally carpeted with native grasses which the early settlers quickly replaced with small-grain crops when they discovered the fertility of the soil. Today, ninety-two percent of the land area of South Dakota is in farms and ranches, attesting to the State's successful agricultural economy. In the past twenty years, land in farms and ranches has risen from 39.5 million to 45 million acres while the number of farms has declined from 72,000 to 53,000. The average farm size is about 840 acres.

The area from the Iowa and Minnesota borders westward to the escarpment that forms the western boundary of the James River valley receives enough rainfall annually for the cultivation of field crops commonly grown in the

North Central States. The area to the west of this "grain belt" is ranchland—one of the principal livestock-producing regions of the Midwest.

The western plains of South Dakota give way to the thickly forested Black Hills. Of the State's total woodland area—about 2,500 square miles—2,000 square miles lie in the Black Hills. The Sioux Indians called the dark, timbered mountains "Papa Sapa," which means "Black Hills." The deep green-black hue of the hills is primarily due to spruce and Ponderosa pine, although aspen, white birch, bur-oak, box-elder, red cedar, and cottonwood also flourish.

Domestic Livestock

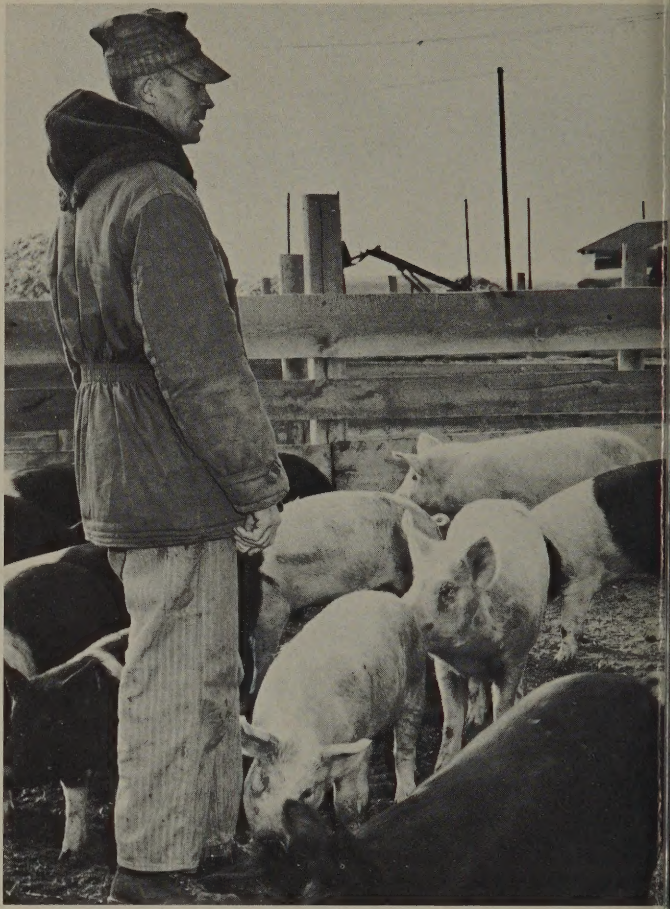
Livestock production is the most important form of agriculture in the State. Farm and ranch land is used mainly for the raising of cattle and hogs. Livestock owners are permitted to graze their animals on public lands under controlled conditions for a monthly fee. Sources of income derived from livestock include eggs, milk, turkeys, sheep, and wool. Livestock contributes approximately $482 million, or 68 percent of the total income of the State's farmers.

The livestock tally of South Dakota's farms and ranches includes 4,278,000 head of cattle and calves; 1,546,000 hogs; 1,535,000 sheep and lambs, including those on feed; and 7,454,000 chickens. Beef cattle number 1,724,000; dairy cows, 256,000; and stock sheep, 1,281,000. South Dakota ranks ninth in the Nation in the number of cattle and calves on farms, with a valuation of $509 million.

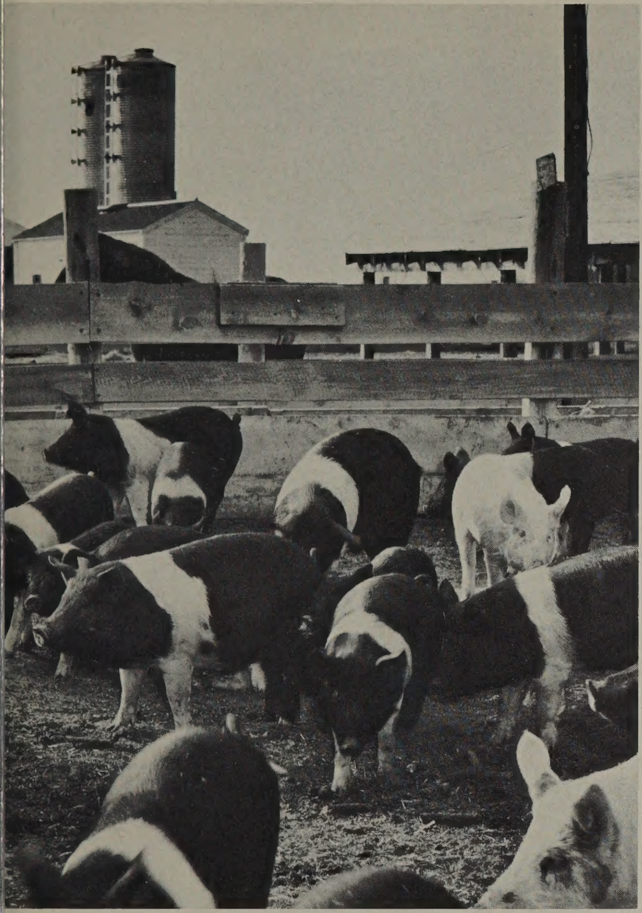
Agricultural Crops

Next to livestock, agricultural crops supply the largest source of agricultural income in the State. Field crops, harvested primarily from dry-farmed acreage, account for 22 percent of the cash farm income.

South Dakota ranks among the top 10 States in the production of wheat, its most valuable field crop. It leads the Nation in the production of bluegrass seed. Other high-ranking crops are corn, oats, barley, rye, flaxseed, alfalfa, and sweet clover seed.

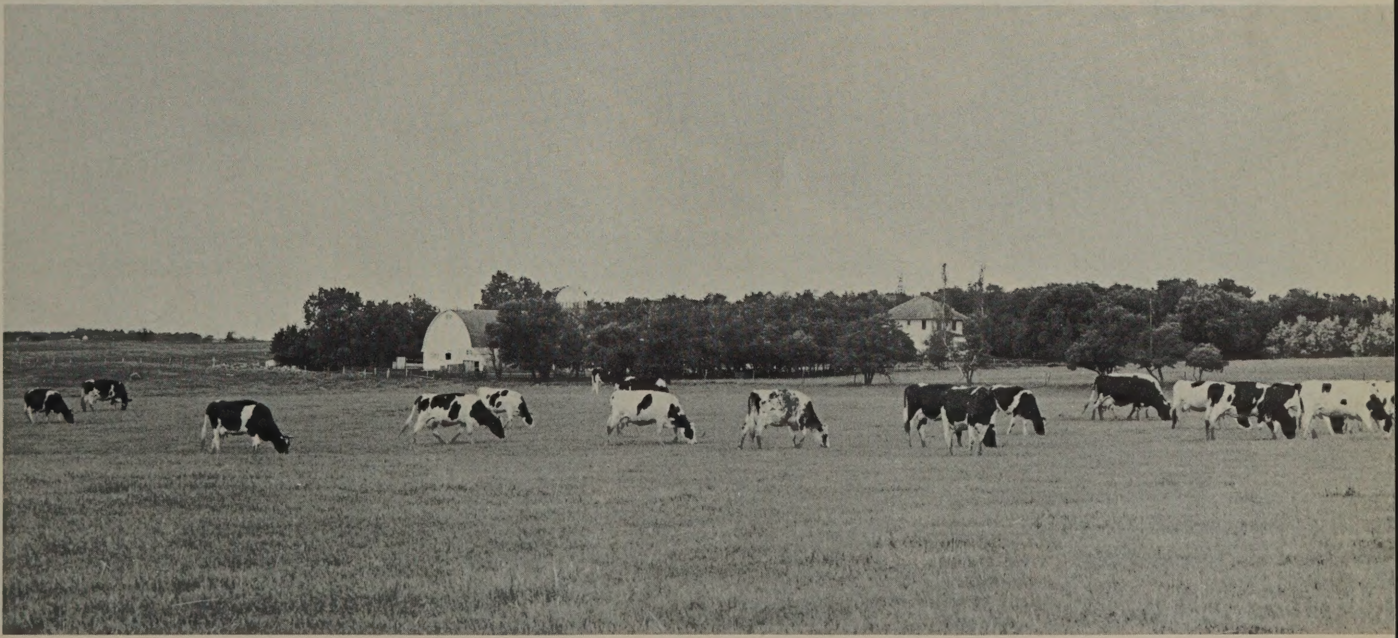


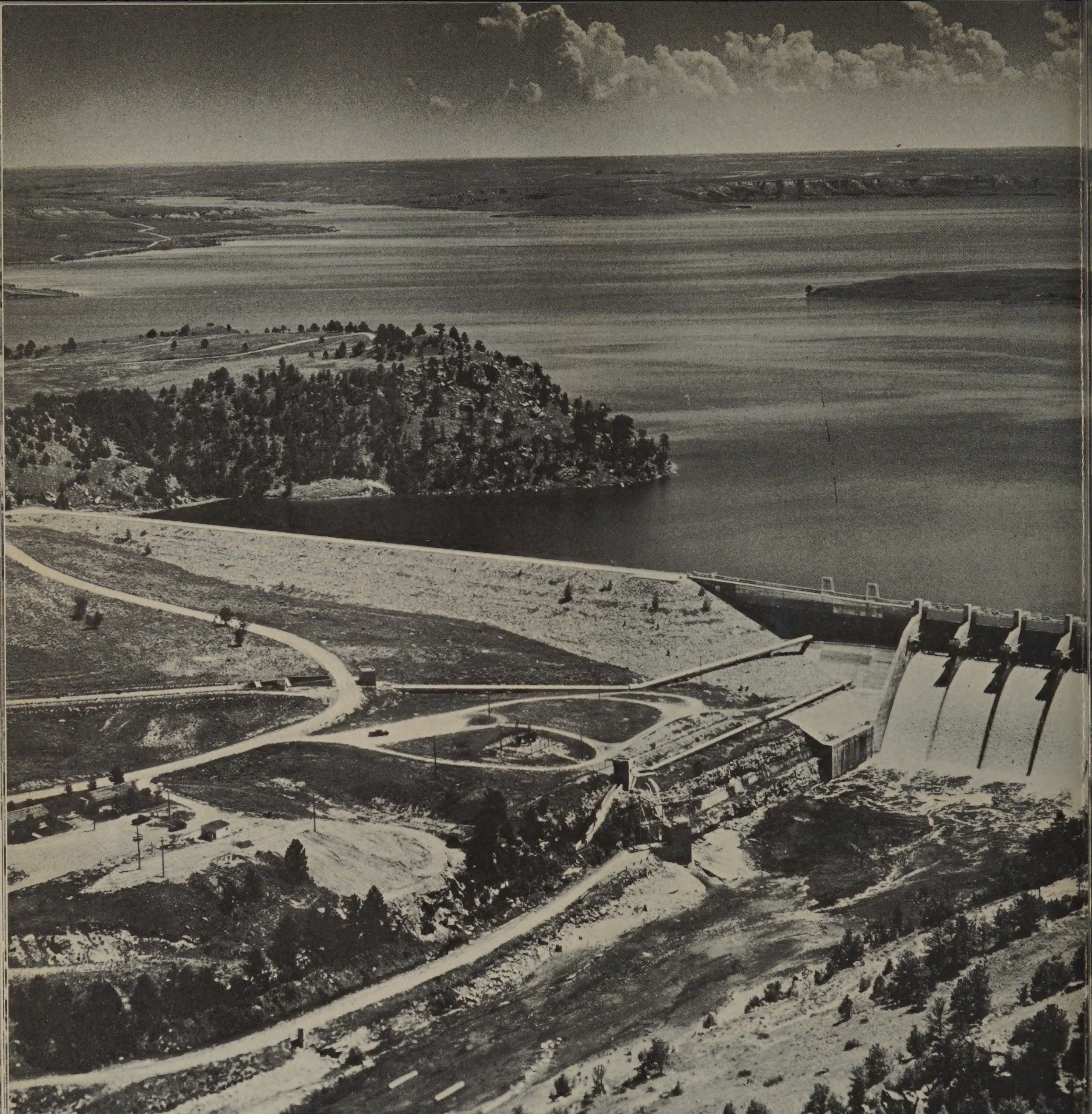
Three-fourths of the rainfall in South Dakota occurs during the April-to-September growing season, a feature which boosts crop production to that of many regions with higher annual precipitation. However, the rainfall varies widely from year to year, bringing forth good crops one season with perhaps a complete crop failure the following season. This erratic pattern produces periods of successive dry years or wet years; a memorable extreme in recent times was the drought of the 1930's bringing with it dust-laden winds which crippled the area. Irrigation, an important part of the plans for development of the Missouri River Basin, and storage dams help to level out agricultural production during these dry periods.

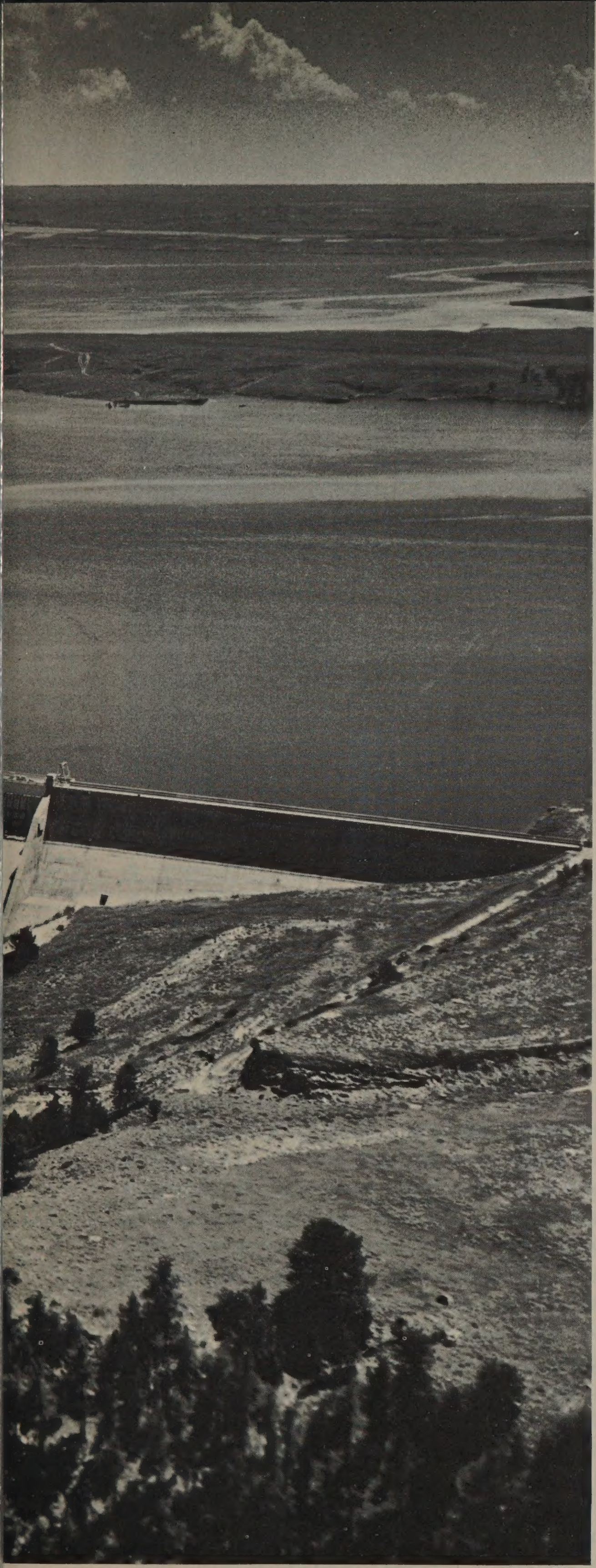


(Above) The soft granite boulders surrounding Sylvan Lake in Custer State Park have weathered into spires and needles. Ponderosa pines enclose this setting.

(Left and below) The principal source of agricultural revenue is livestock production. Cattle and hogs top the list, followed by sheep, wool, turkeys, and eggs.







Water and Power

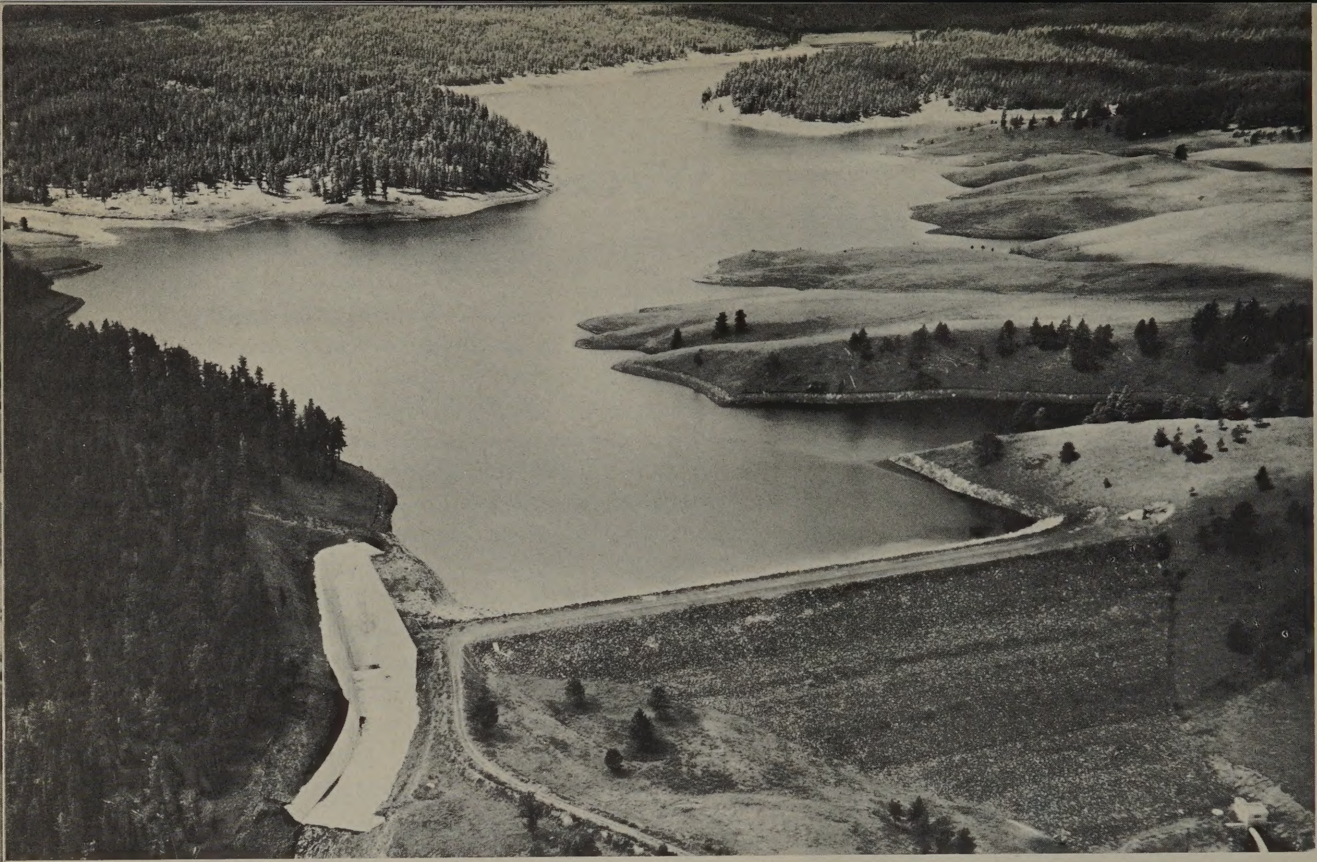
Water is one of South Dakota's most important resources. It has often been said that it ranks next to the State's people and soil in order of importance. South Dakota's water is of moderate quantity and variable distribution.

In 1963 the Geological Survey and the Bureau of Reclamation, in cooperation with the South Dakota State Geological Survey and the School of Mines and Technology, completed a study of water resources in South Dakota that showed that on a statewide basis of present total water use, irrigation uses 56 percent; municipalities and industry 27 percent; and farm-domestic purposes 17 percent. Of the 285.3 million gallons withdrawn per day, ground water sources supply 57 percent and surface water furnishes the remainder.

South Dakota's water resources are being conserved through multipurpose development by the Bureau of Reclamation and the Corps of Engineers.

Precipitation, the key to all water supply, ranges from less than 13 inches in northwest South Dakota to more than 25 inches in the

(Left) Oahe Dam, largest in power output of the four Missouri Basin dams. (Above) Water from irrigation transforms dry land to soil suitable for sugar beets.



Deerfield Dam in the Rapid Valley Unit harnesses power from Castle Creek and forms a large water storage reservoir.

extreme southeast and in the higher elevations of the Black Hills. Though great variations exist from place to place and from year to year, the annual average for the State is about 18 inches. In most years about three-fourths of the precipitation falls during the April-to-September growing season.

Runoff—water that drains from the land into rivers and streams—is slight in South Dakota, varying from a minimum of about one-quarter of an inch in the north-central part of the State to a maximum of slightly less than 2.5 inches in the southeast corner and in the upper elevations of the Black Hills. Average runoff per year is about 0.7 inch compared to the national average of 9 inches. The runoff totals 2.6 billion gallons a day, or about 3 million acre-feet per year. However, the Missouri and other rivers draining areas outside the State bring much water into South Dakota.

Irrigation

South Dakota's irrigation development has been limited by the high cost of providing the large storage reservoirs necessary to insure a dependable supply from the widely-fluctuating plains streams. About 170,000 acre-feet of water per year is withdrawn from streams or pumped from underground to irrigate 140,000 acres of land. However, only part of that amount is consumed on the irrigated land. Evaporation from water surfaces, transpiration by plants along diversion canals and reservoirs, and seepage take their share of water before it reaches the land to be irrigated. Some of the water lost by seepage does find its way back to the streams or to ground-water bodies, where it can then be diverted again. Large-scale irrigation projects border the only mountainous area of the State—the Black Hills—and utilize the more dependable streamflows from that region.

Plans for development of the Missouri River Basin include irrigation of several hundred thousand acres in eastern South Dakota, utilizing Missouri River water. Implementation of this plan, combined with development of many small irrigation units based upon the use of ground water, tributary streams, and the Mis-

Besides supplying hydroelectric power, dams and reservoirs create a wide variety of outdoor recreation opportunities.

souri River as sources of supply, will add considerably to the stability of the State's economy.

Ground Water

Ground water is an important resource in South Dakota and supplies most of the municipal and rural domestic water, about half of the industrial water, and a substantial part of the irrigation water.

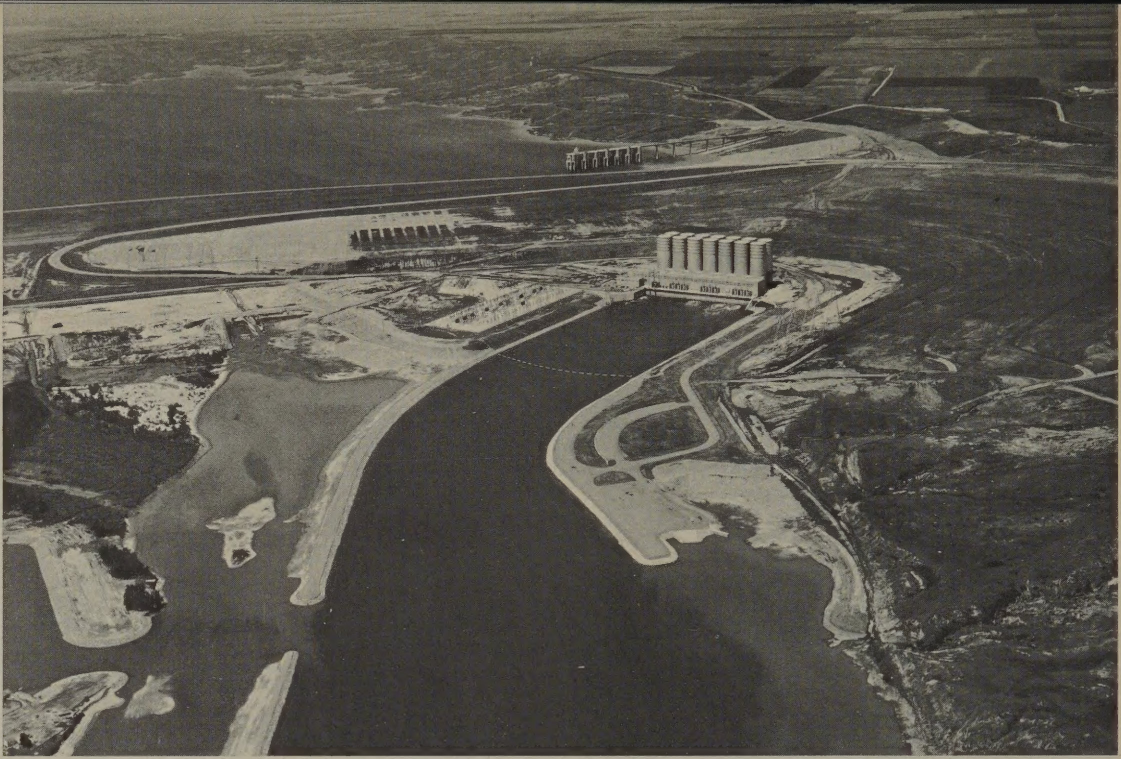
Aquifers, underground formations which contain water, underlie much of the State and have been a major factor in the State's development. The most important aquifers are under artesian pressure and some artesian wells have enough internal pressure to bring the water to the land surface, thus creating a flowing well, while in others, water must be pumped. Because shallow ground water in the western part of the State is confined largely to the alluvium in the river valleys, the development of the region has largely depended on the availability of artesian water supplies.

The soils of the area east of the Missouri River were formed from weathered glacial drift. The drift—composed of a mixture of clay, sand, gravel, and boulders and outwash, chiefly sand and gravel—forms the most promising source of ground water of good quality for future development of the State's water potential. The average thickness of the glacial drift is about 40 feet, although the drift near Eden in Marshall County in northeastern South Dakota is 700 feet.

Aquifers in the glacial outwash have been extensively developed in eastern South Dakota. An estimated 11,000,000 acre-feet of ground water in transient storage underlies approximately 886,000 acres near the James River between Aberdeen and Woonsocket—including parts of Sanborn, Beadle, Spink, Hand, and Brown Counties. The sand and gravel range in thickness from 10 feet to over 100 feet. An additional major source of ground water supply, a buried outwash aquifer beneath Clay County, contains an estimated 6,000,000 acre-feet of ground water which is also in transient storage.

Water Rights

In South Dakota the right to use surface and ground water is regulated by the State Water



One of four dams which harness water from the Missouri River Basin, Oahe has a power output of 595,000 kilowatts.

Resources Commission, created in 1955 by an act of the State Legislature. The Commission, composed of seven members appointed by the Governor, and an executive officer who is a licensed engineer, is empowered to enforce the State water laws, to issue permits for water use, and to set up specifications for wells, dams, and water-conveyance structures.

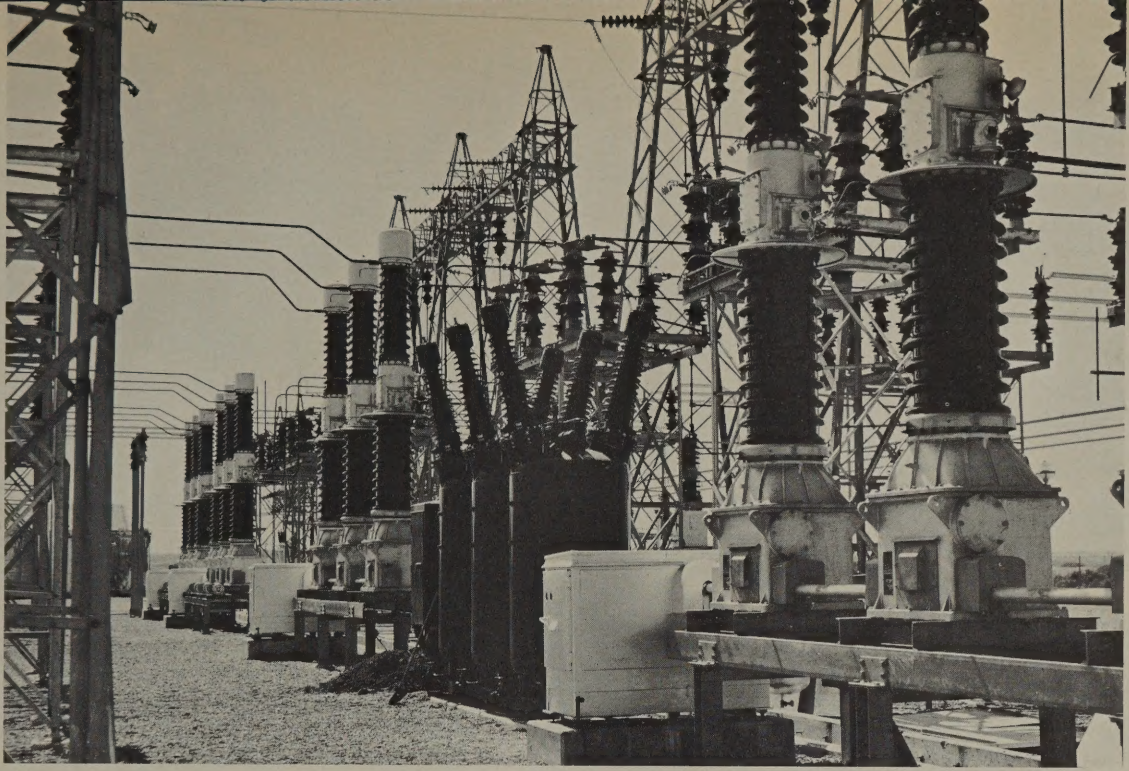
The Mighty Missouri

The Missouri River and its tributaries drain South Dakota from two principal directions—east and west. The western tributaries—the Grand, Moreau, Cheyenne, Bad, and White Rivers—all flow generally eastward through meandering, narrow valleys, flanked on each side by high rolling prairies. The White River in the southern part of the State penetrates the Badlands country, while the Cheyenne River skirts the southern flank of the Black Hills. Headwaters of Rapid Creek and other tributaries are within the Black Hills. The Belle Fourche, a tributary of the Cheyenne, outlines the northern edge of the Hills.

East of the Missouri River drainage is generally southward and includes basins of the James, Vermillion, and Big Sioux Rivers. The James River rises in the glaciated plateau near the center of North Dakota, extends eastward about 40 miles, then runs almost due south for a distance of 400 miles to its confluence with the Missouri below Yankton, South Dakota. Between Jamestown, North Dakota, and the mouth of the river, the average fall of the valley of the James River is only 0.5 foot per mile. The James is often termed the longest unnavigable river in the world. The Vermillion River, in the southeastern part of the State, is situated between the James and the Big Sioux, and drains into the Missouri at Vermillion.

Power

The Missouri River is the principal source of hydroelectric power in South Dakota. With four of the six major main-stem dams and a number of small tributary projects within its boundaries, South Dakota is a key state in the comprehensive plan for the Missouri River Basin. Powerplants are in operation at Oahe, Fort Randall, and Gavins Point Dams, with power outputs of 595,000, 320,000, and 100,000 kilowatts respectively. In addition, the eight 58,500 kilowattt units of the Big Bend Powerplant are in operation. Both inside and outside the State, these Missouri River Basin multipur-



At the Sioux Falls Substation, circuit breakers carry and control the electric power, harnessing the water energy.

pose projects, along with other developments on the main-stem of the Missouri River, provide assured stream flows for navigation and hydroelectric power production, as well as stream sanitation and security from floods. They will also provide an improved water supply for irrigation and for municipal and industrial uses, including a chain of lakes for recreation.

The seven existing privately owned hydroelectric powerplants in South Dakota, all but one of which are located in the Black Hills, have a total power capacity of about 10,000 kilowatts.

Pollution

South Dakota is not immune to the ever-present and growing problem of water pollution because its waters, too, suffer from the side effects of industrial progress in the State. The Black Hills region contributes its share of mining and ore milling wastes to the South Dakota streams. In the east, drainage from farmlands and feedlots imposes heavy loads in the James and Sioux Rivers; surface runoff leaches fertilizers and nutrients from farmlands and carries them into the lakes and streams where they cause extensive, troublesome algal growths. Uranium processing, meatpacking, and the atomic-reactor plant near Sioux Falls add their toxic substances and wastes to the rivers, and are supplemented as sources of pollution by the organic chemical concentrates of increasingly-used pesticides.

The more optimistic side of the water-pollution picture reveals itself, however, in the fervor with which the citizens of South Dakota have recognized and attacked the pollution problem. All communities along the Missouri River and in many other parts of the State have sewage treatment plants completed or in various stages of planning and construction. Almost without exception, South Dakotans have strongly supported and cooperated in these municipal projects, realizing that many acute pollution problems have been local ones, and thus must be solved locally.

The Committee on Water Pollution, for which the Division of Sanitary Engineering in the State Department of Health provides administrative and technical services, is responsible for the State program. It is confident that the development of water pollution control facilities and programs will keep pace with future population and industrial growth in South Dakota.

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Outdoor recreation opportunities, including swimming, water-skiing, camping, hunting, and fishing, draw both tourists and residents to South Dakota's playgrounds. The tourist industry is increasing yearly in economic significance.

Parks and Recreation

Information tables listing major Federal, State, and local recreation areas in South Dakota and a location map appear at the end of this chapter. The acreage, type of visitor use, and outdoor activities available at the various parks, forests, and recreation sites can be found by reading across the table.

Lewis and Clark Lake near Yankton attracts sailing enthusiasts and others who enjoy water recreation.

South Dakota offers a variety of recreational opportunities, from plentiful game for hunting to unusual scenic and historic areas. The assortment of surface features—the Black Hills and the Badlands in the west, the Missouri River in the central portion, and the pothole lakes of the northeast—presents a fascinating array of sights for the traveler.

Federal Areas

More than 142,000 acres are now included in one national park, two national monuments, and one national memorial, administered by the Department of the Interior's National Park Service. These points of interest draw about 3,500,000 people each year.

Wind Cave National Park, 28,059 acres, located in the heart of the scenic Black Hills, was established in 1903 and was the State's first area to be included in the National Park System. It preserves, in relatively unspoiled condition, part of the original grassland.

Wind Cave consists of a distinctly different type of limestone cavern—a series of subterranean passages and rooms, some lined with

Visitors to Wind Cave admire strange calcite forms and unusual limestone patterns on the cave ceiling.

colorful calcite crystal formations, others delicately marked by "boxwork," and still others covered with "frostwork" and "popcorn" formations. The cave derives its name from the whistling sounds which escape from openings at the ground surface and are believed to be caused by changes in atmospheric pressure.

One of the park's main attractions is the herd of bison that roams over the 44 square miles of rolling woodlands and plains—one of the few remaining "Prairie Monarch" herds of its kind. In addition, there are towns of blacktailed prairie dogs, roaming American elk, pronghorn antelope, deer, coyotes, and other animals.

Main entrance routes to the park are U.S. 385 and South Dakota Highway 87.

Badlands National Monument, 111,530 acres in southwestern South Dakota, was established in 1939 to preserve a singular region which is noted for its weirdly beautiful landscapes, outstanding examples of erosion, and fossil remains of prehistoric animals. The Badlands illustrate a great land-changing process whereby delicately color-banded formations of sedimentary rock have been cut in cross section by erosion so that conditions of the past are revealed in page-like layers of rock. Heavy rains continue to sculpture the soft rocks and loose soil into towering spires and pinnacles, and the sun dries the shapes into hard turreted ridges and sharp gullies.

Fossil remains indicate that prehistoric animals frequented the Badlands over 40 million years ago. The fearsome saber-toothed cat made its home here, preying upon the ancestors of the camel and pig, the three-toed progenitor of the horse, and the titanothere, a gigantic rhinoceros-like grass eater. Ancestral fossilized forms of gulls, pelicans, eagles, owls, and squirrels have also been found, making the Badlands one of the richest fossil areas in the country.

Badlands National Monument is served by U.S. 16A which passes through the monument between Wall, South Dakota, and a junction with Interstate 90 and U.S. 16 about 4 miles east of the monument.

Jewel Cave National Monument, 1,275 acres in southwestern South Dakota, is on a high rolling plateau that ranges from 5,200 to 5,800 feet above sea level, broken by many gulches and ravines. The site was originally recorded as a mining claim—the Jewel Lode—discovered in 1900 by Albert and F. W. Michaud. It was established as a National Monument in 1908 under the jurisdiction of the Department of Agriculture, and in 1933 it was transferred to the National Park Service.

The portion of the cave originally established

Located high in the Hills, Sheridan Lake offers a pleasant spot in which to fish and enjoy nature.

as a national monument consists of a series of chambers connected by narrow passages and supplemented with many side galleries whose walls are lined with a sparkling coating ot dogtooth calcite crystals.

Legislation approved by President Johnson in 1965 added some spectacular newly-discovered cave sections to the monument which will be opened to the public when necessary work has been completed.

The cave may be approached from U.S 16 which crosses the southeastern section of the monument.

Mount Rushmore National Memorial, an unforgettable monument to democracy, covers 1,278 acres of land in the Black Hills. The heroic likenesses of four Presidents—George Washington, Thomas Jefferson, Theodore Roosevelt, and Abraham Lincoln—project boldly from the granite face of 6,000-foot Mount Rushmore, delineating the features of each face in proportions symbolic of their greatness. Each head is 60 feet high, or twice as large as the Great Sphinx.

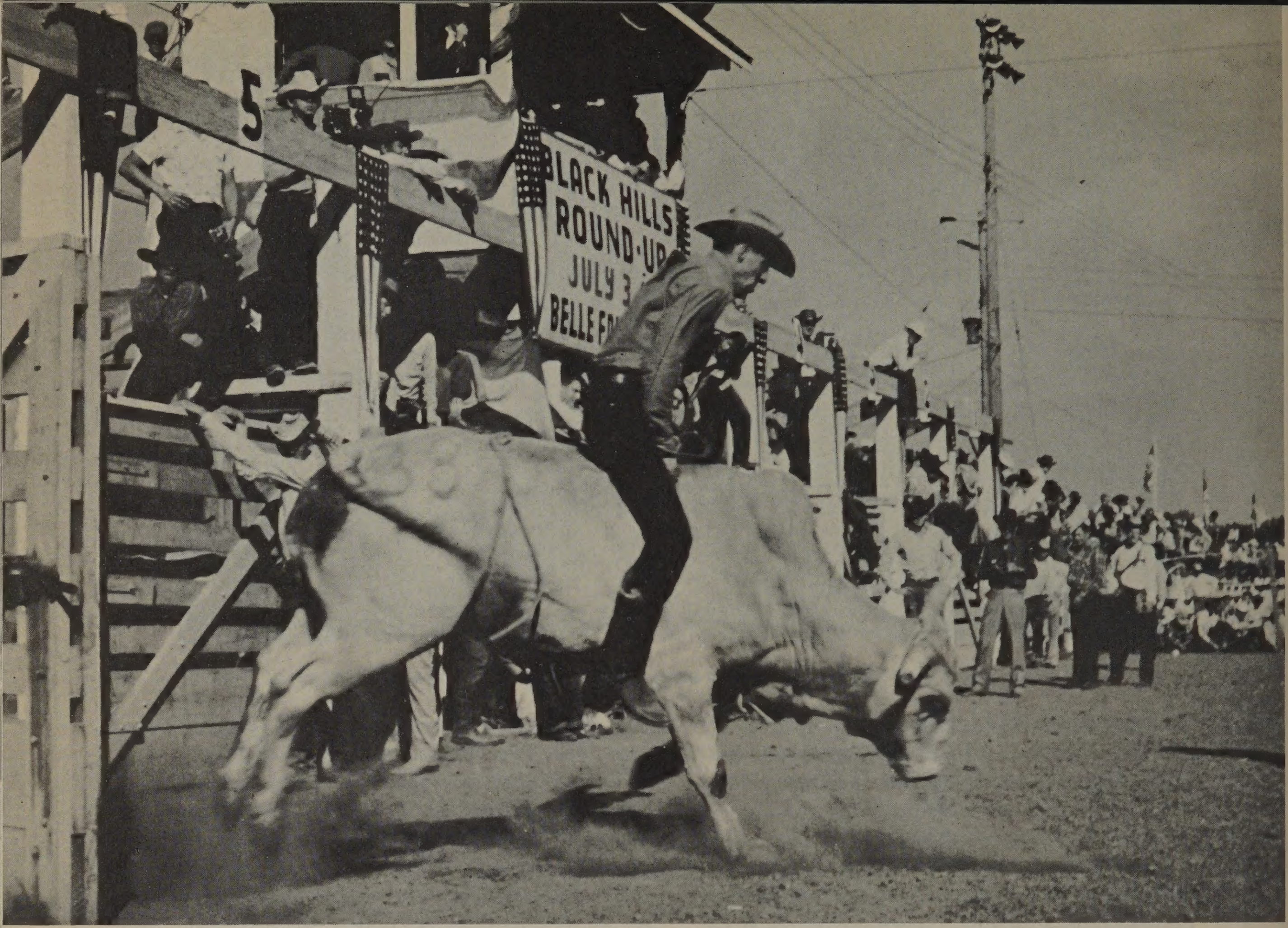
The work was authorized in 1925 and executed by Gutzon Borglum in figures carved to the scale of men 465 feet tall. The faces were formed by drilling and blasting and by cutting with jackhammers, with the actual work performed by ex-miners in swing seats. More than 400,000 tons of rock were removed to complete the monument and the project was completed in 6½ years, in October 1941. Gutzon Borglum died 6 months before its completion, leaving the final work to his son Lincoln Borglum.

The memorial is 25 miles southwest of Rapid City and 3 miles from Keystone. A paved road leads west from U.S. 16A to the memorial.

National Forest Recreation

The 1,404,877 acres of National Forest land in South Dakota include 1,327,051 acres of the Black Hills National Forest and a 77,826-acre portion of the Custer National Forest. As land of the frontier days, steeped in history and accentuated with rugged natural beauty, the national forest lands of South Dakota are a mecca for tourists and recreationists. Here one finds reminders of the historic gold rush era; here lived and died such fabled characters as Calamity Jane, Wild Bill Hickok, Deadwood Dick, and Preacher Smith. Within the Black Hills is the inspiring sculpture of Mount Rushmore, and not far away lie the desolate Badlands.

For the past 2 years the Black Hills National Forest has topped all national forest areas in popularity. Recently 3.7 million visits were



A rodeo at Belle Fourche recalls the wild and wooly days of pioneers and frontiersmen. South Dakota's proximity to the western states explains its large share in the making of traditions which are typical of the West of yesteryear.

made to this mountainous, lake-dotted forest. The Black Hills abound in lake and stream fishing, with 250 miles of trout streams and natural and artificial lakes to lure the sportsman. Campers find a choice of 26 campgrounds, 34 picnic units, 3 swimming beaches, and 2 winter sports areas. Natural features of the Hills, in addition to Harney Peak—the highest rise east of the Rocky Mountains—include spectacular canyons and waterfalls, crystal caves, and magnificent stands of pines. The headquarters of the Black Hills National Forest is in Custer, while the forest itself lies within the first mountainous area which greets the plains-weary traveler from the East.

State Recreation Resources

The South Dakota State Department of Game, Fish and Parks supervises 98 parks and recreation areas which cover almost 89,000 acres. The largest State park, Custer State Park, encompasses more than 100,000 acres. State parks include among others, Bear Butte, Roy Lake, Hartford Beach, Oakwood Lakes, Farm Island, Lake Herman, and Newton Hills. The many recreation areas offer opportunities for a variety of activities, including winter and water sports, camping, hiking, hunting, and fishing. Over 200 hunting and fishing areas are available to the sportsman.

The "great lakes" of South Dakota, formed by four large dams across the Missouri River, offer 703 square miles of water and nearly 2,500 miles of shoreline, as well as excellent fishing. Thirty-three different species of fish are found, including such prehistoric relics as paddlefish. Motorboating, sailing, swimming, skiing, skin-

Recreation takes many forms in South Dakota, varying with the season, the terrain, and the mood of participants. Above, horses, people and water meet in an exhilarating combination on a summer day in the stream-laced mountains.

diving, and excursion-boat tours to historic sites add to the attraction of the lakes as recreation areas.

The State also maintains 50 roadside parks as welcome rest stops along major highways. The South Dakota State Historical Society has provided markers and monuments at many points of interest throughout the State.

Privately Owned Recreation Facilities

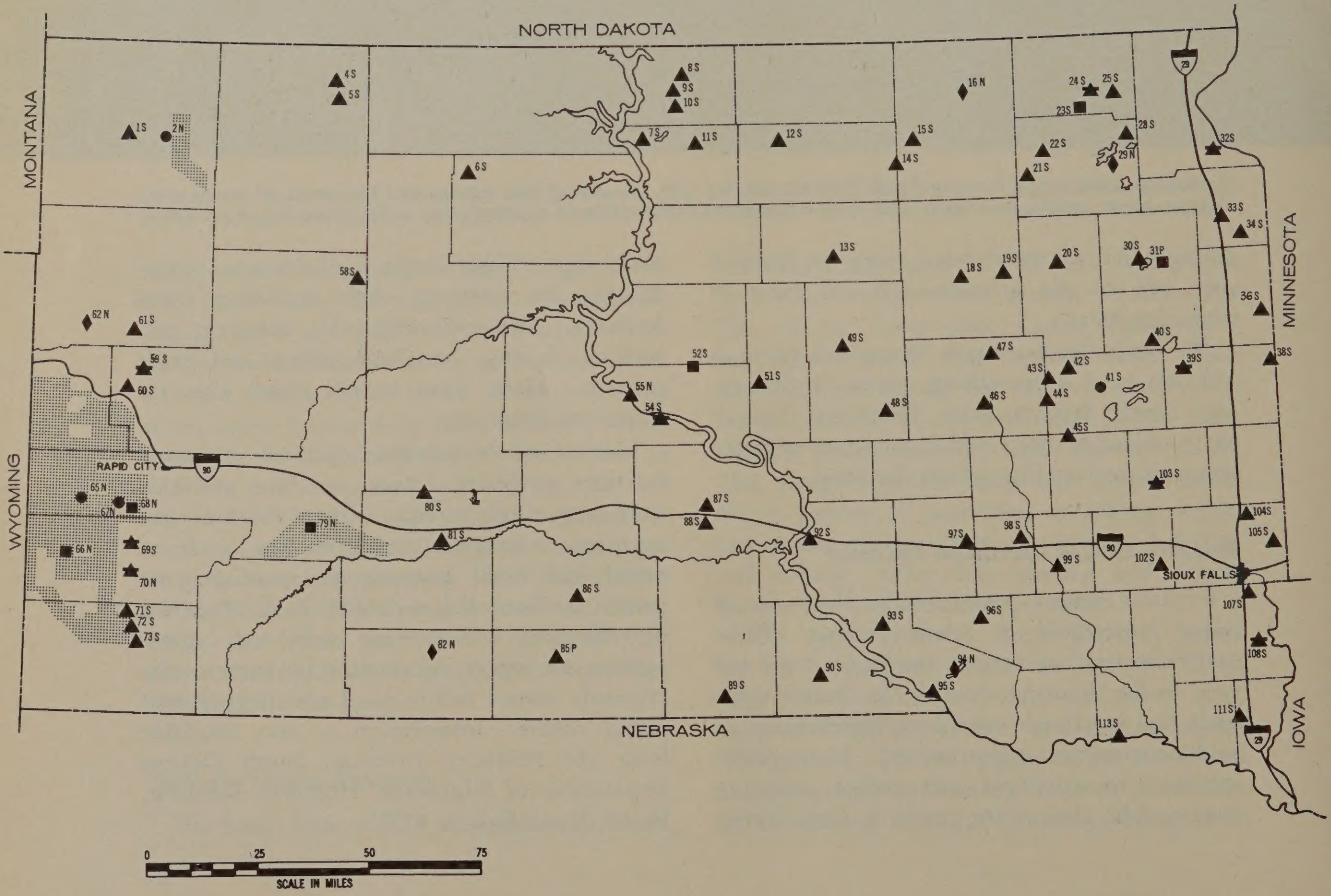
Privately owned recreation facilities are of major importance in South Dakota. These vary from resident summer camps for boys and girls to fine hunting areas. The State's croplands and grasslands contribute significantly to outdoor recreation opportunities. Many places operate as vacation farms and ranches, accepting tourists who live at the ranch or farm during their stay. Others offer facilities and opportunities for hunting, often including cabin facilities. Still others provide camping, picnicking, fishing, horseback riding, and guide services. Many lease or sell scenic sites for home and camp lots.

Lists of all the privately-operated recreation facilities in South Dakota are not available from any single source. Travel bureaus and agencies, commercial organizations such as motel and hotel associations, gasoline companies, airlines and railroads, local chambers of commerce, and outdoor clubs and organizations can supply information on many of the privately owned facilities. Local inquiry will reveal others. Information is also available from the Publicity Division, South Dakota Department of Highways, Highway Building, Pierre, South Dakota 57501.

South Dakota

Park	★
Recreation Area , Etc.	▲
Monument	■
Wildlife Area	♦
Forest	●

NATIONAL FOREST


NORTH DAKOTA
MONTANA
WYOMING
MINNESOTA
IOWA
NEBRASKA
RAPID CITY
SIOUX FALLS
90
29
1S
2N
4S
5S
6S
7S
8S
9S
10S
11S
12S
13S
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25
50
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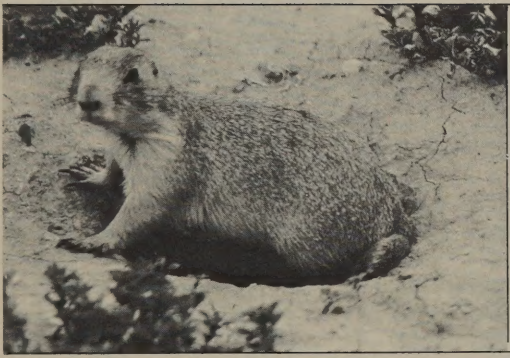
SCALE IN MILES

Outdoor Recreation Guide

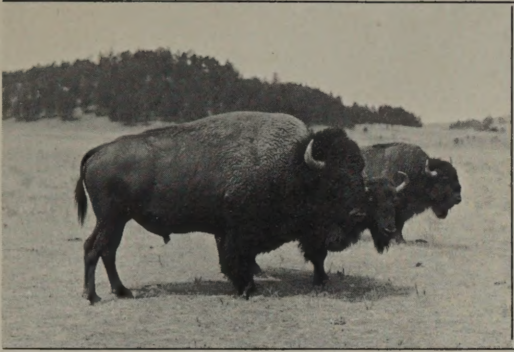
How To Use This Guide

Information on major areas offering recreation is given in the listings on the following pages. Each area can be located on the map by matching its number with the corresponding number on the map. Symbols on the map represent types of areas. Letters after the numbers refer to Federal (N), State (S), local (L), and quasi-public and private (P). Only major interstate highways and major cities are shown on the map. A road map will provide exact routes to those areas you may wish to visit.

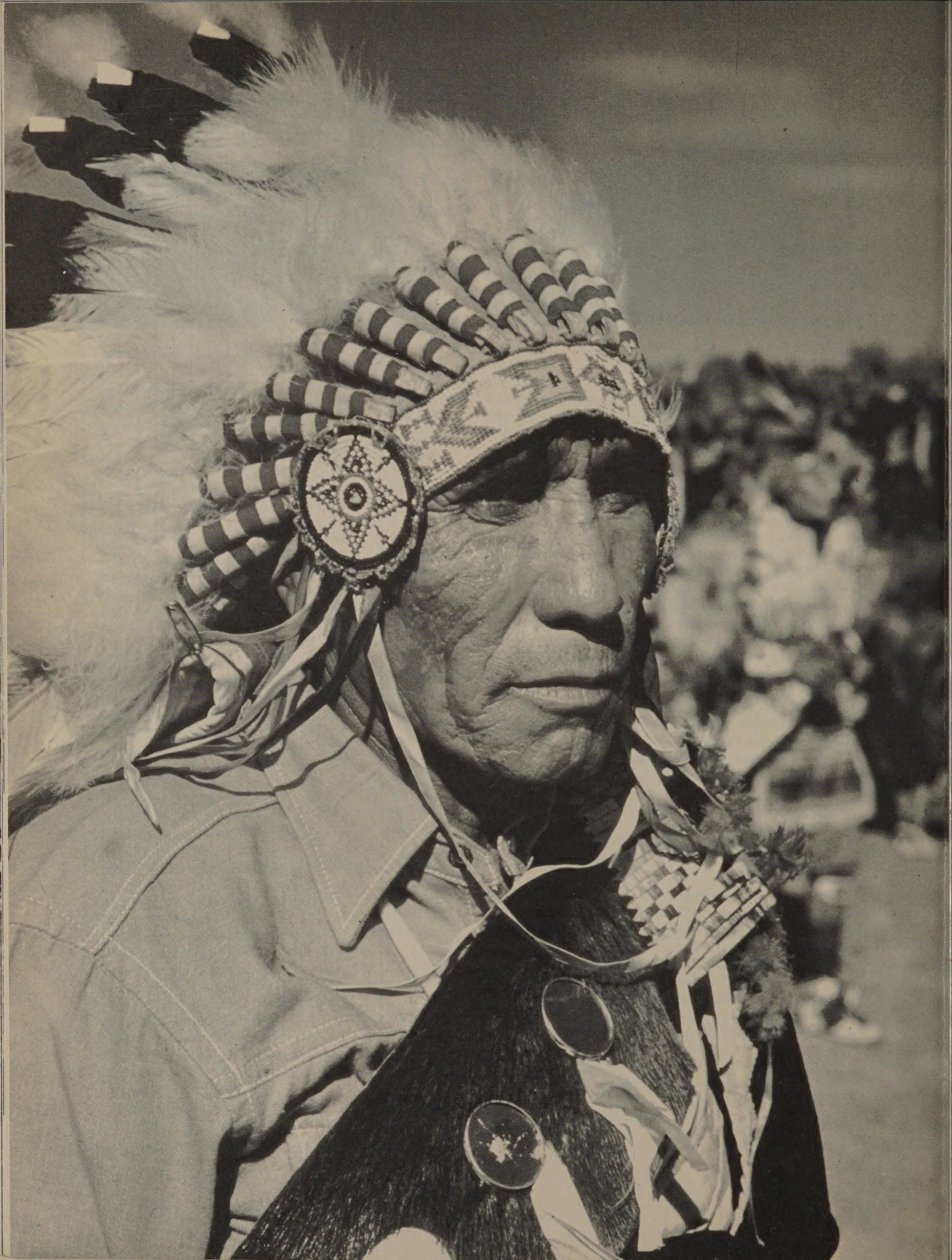


	Number on map	Acreage		Type of use				Activities									
		Total land and water within area	Water surface	Day and weekend	Vacation	Out-of-State target	Tourist en route	Picnicking	Hiking and riding	Camping	Boating	Swimming	Fishing	Hunting	Nature study	Winter sports	Wilderness experience
FEDERAL																	
Park: Wind Cave National Park	70N	28, 059	....	x	x	x	x	x	x	x	..	..	..	..	x	..	x
Recreation area: Oahe Dam (Corps of Engineers)	55N	70, 000	358, 100	x	x	..	x	x	..	x	x	x	x	x	x	..	..
Monuments:																	
Scientific:																	
Jewel Cave National Monument	66N	1, 275	....	x	x	x	x	x	x	x	..	..	..	..	x	..	..
Badlands National Monument	79N	98, 806	....	x	x	x	x	x	x	x	..	..	..	..	x	..	..
Historic: Mount Rushmore National Memorial	68N	1, 220	....	x	x	x	x	..	..	..	..	..	..	..	..	..	..
Forests:																	
Custer National Forest	2N	73, 707	....	x	x	x	x	x	x	x	..	..	x	x	x	x	x
Black Hills National Forest	65N	1, 047, 106	....	x	x	x	x	x	x	..	..	..	x	x	x	x	x
(Norbeck Wildlife Preserve)	67N	(46, 000)	....	x	x	x	x	x	x	..	..	..	x	x	x	x	x
Wildlife areas:																	
Sand Lake National Wildlife Refuge	16N	9, 277	12, 174	x	x	x	x	x	..	x	x	x	x	x	x	..	..
Waubay National Wildlife Refuge	29N	2, 587	1, 872	x	..	x	x	x	..	x	x	x	x	x	x	..	..
Belle Fourche National Wildlife Refuge	62N	5, 640	8, 040	x	..	x	x	x	..	x	x	x	x	x	x	..	..
La Creek National Wildlife Refuge	82N	993	4, 449	x	..	x	x	x	..	x	x	x	x	x	x	..	..
Lake Andes National Wildlife Refuge	94N	672	270	x	..	x	x	x	..	x	x	x	x	x	x	..	..

	Number on map	Acreage		Type of use				Activities									
		Total land and water within area	Water surface (7)	Day and weekend	Vacation	Out-of-State target	Tourist en route	Picnicking	Hiking and riding	Camping	Boating	Swimming	Fishing	Hunting	Nature study	Winter sports	Wilderness experience
STATE																	
Parks:																	
Bear Butte State Park	59S	1, 200	. . . .	x	x	. .	x	x	x	x	. .	. .	. .	. .	x	. .	. .
Roy Lake State Park	24S	632	800	x	x	. .	x	x	x	x	x	x	x	x	x	. .	. .
Hartford Beach State Park	32S	60	9, 600	x	x	. .	x	x	x	x	x	x	x	x	x	. .	. .
Oakwood Lakes State Park	39S	106	600	x	x	. .	x	x	x	x	x	x	x	x	x	. .	. .
Farm Island State Park	54S	1, 800	. . . .	x	x	x	x	x	x	x	x	x	x	x	x	. .	. .
Custer State Park	69S	72, 000	. . . .	x	x	x	x	x	x	x	x	x	x	. .	x	. .	x
Lake Herman State Park	103S	120	1, 880	x	x	x	x	x	x	x	x	x	x	. .	x	. .	. .
Newton Hills State Park (3)	108S	680	. . . .	x	x	x	x	x	x	x	. .	. .	. .	. .	x	. .	. .
Recreation areas:																	
Tipperary Cooperative	1S	3	. . . .	x	. .	. .	x	x	. .	. .	. .	. .	. .	. .	. .	. .	. .
Llewellyn-Johns Memorial	4S	80	. . . .	x	. .	. .	x	x	. .	x	. .	. .	. .	. .	. .	. .	. .
Shadehill Reservoir	5S	1, 253	4, 800	x	. .	. .	x	x	. .	x	x	x	x	x	x	. .	. .
Lake Isabell Cooperative	6S	20	90	x	. .	. .	x	x	x	x	x	x	x	x	. .	. .	. .
Lake Molstad Cooperative	7S	20	20	x	. .	. .	x	x	x	x	x	x	x	. .	. .	. .	. .
Pollock Cooperative	8S	67	. . . .	x	. .	. .	x	x	x	x	x	x	x	. .	. .	. .	. .
Herreid Cooperative	9S	2	. . . .	. .	. .	. .	. .	x	. .	. .	. .	. .	. .	. .	. .	. .	. .
Lake Campbell Cooperative	10S	60	1, 000	x	x	. .	x	x	. .	x	x	x	x	x	x	. .	. .
Lake Hiddenwood State Park	11S	169	30	x	x	. .	x	x	x	x	x	x	x	x	x	. .	. .
Bowdle-Hosmer Cooperative	12S	40	130	x	. .	. .	x	x	. .	. .	. .	. .	. .	. .	. .	. .	. .
Lake Faulkton State Recreation Area	13S	320	100	x	. .	. .	x	x	x	x	x	x	x	. .	. .	. .	. .
Mina Lake Cooperative	14S	200	40	x	. .	. .	x	x	x		x	x	x	. .		. .	. .
Richmond Lake State Recreation Area	15S	480	1, 000	x	. .	. .	x	x	x	x	x	x	x	. .	. .	. .	. .
Fisher Grove State Park	18S	120	. . . .	x	x	. .	x	x	. .	x	. .	. .	x	. .	. .	. .	. .
Doland Cooperative	19S	10	. . . .	x	. .	. .	x	x	. .	. .	. .	. .	. .	. .	. .	. .	. .
Bailey Lake Cooperative	20S	32	300	x	. .	. .	x	x	. .	. .	x	x	x	. .	. .	. .	. .
Amsden Dam Cooperative	21S	13	80	x	. .	. .	x	x	. .	. .	x	x	x	. .	. .	. .	. .
Lake Pierpont Cooperative	22S	160	60	x	. .	. .	x	x	x	x	x	x	x	. .	. .	. .	. .
Clear Lake Recreation Area	25S	3	600	x				x			x	x	x				
Pickerel Lake State Recreation Area	28S	60	700	x	. .	. .	x	x	. .	x	x	x	x	. .	x	. .	. .
Sandy Shores State Recreation Area	30S	8	5,160	x	. .	. .	x	x	. .	. .	x	x	. .	. .	. .	. .	. .
Stockholm Cooperative	33S	20	. . . .	x	. .	. .	x	x	. .	. .	. .	. .	. .	. .	. .	. .	. .
Labolt Cooperative	34S	29	7	x	. .	. .	x	x	. .	. .	. .	. .	. .	. .	. .	. .	. .
Ulven Beach Cooperative	36S	17	600	x	. .	. .	x	x	. .	x	x	x	x	x	. .	. .	. .
Lake Hendricks State Recreation Area	38S	6	1, 600	x	. .	. .	x	x	x	x	x	x	x	. .	. .	. .	. .
Lake Norden Cooperative	40S	5	700	x	. .	. .	x	. .	. .	x	x	x	x	x	. .	. .	. .
Lake Agnew Cooperative	42S	40	40	x	. .	. .	x	x	. .	. .	x	x	x	. .	. .	. .	. .
Lake Osceola State Recreation Area	43S	40	80	x	. .	. .	x	x	. .	x	x	x	x	. .	. .	. .	. .
Lake Iroquois Cooperative	44S	160	80	x	. .	. .	x	x	. .	x	x	x	x	. .	. .	. .	. .
Lake Carthage Cooperative	45S	4	38	x	. .	. .	x	. .	. .	. .	. .	. .	x	. .	. .	. .	. .
Huron Memorial Park Cooperative	46S	30	. . . .	x	. .	. .	x	x	. .	. .	. .	. .	. .	. .	. .	. .	. .
Lake Byron State Recreation Area	47S	15	1, 200	x	. .	. .	x	x	. .	. .	x	x	x	. .	. .	. .	. .
Rose Hill Cooperative	48S	20	. . . .	x	. .	. .	x	x	. .	. .	x	. .	x	. .	. .	. .	. .
Lake Louise State Recreation Area	49S	320	135	x	. .	. .	x	x	. .	x	x	x	x	. .	. .	. .	. .



	Number on map	Acreage		Type of use				Activities									
		Total land and water within area	Water surface	Day and weekend	Vacation	Out-of-State target	Tourist en route	Picnicking	Hiking and riding	Camping	Boating	Swimming	Fishing	Hunting	Nature study	Winter sports	Wilderness experience
STATE—Continued																	
Recreation areas—Continued																	
Lake Chapelle Cooperative	51S	56	20	x			x	x		x	x	x	x				
Durkee Lake Cooperative	58S	640	78	x			x	x			x	x	x				
Bear Butte Lake Cooperative	60S	25	150	x			x	x			x	x					
Newell Lake Cooperative	61S	15	80	x			x	x									
Cold Brook Reservoir	71S	472	1, 851	x	x		x	x		x	x	x	x				
Battle Mountain	72S	10		x			x	x									
Angostura Reservoir	73S	472	4, 800	x	x		x	x	x	x	x	x	x	x	x	x	
Bad River State Recreation Area	80S	8		x			x	x	x				x				
Kadoka Lake Cooperative	81S	160	200	x			x	x			x	x	x				
White River Cooperative	86S	17	10	x			x	x			x	x	x				
Lake Byre Cooperative	87S	30	4	x			x	x	x		x	x	x				
Fate Lake Cooperative	88S	20	30	x			x	x	x		x	x	x				
Rahn Lake Cooperative	89S	80	40	x			x	x									
Burke Lake Cooperative	90S	160	20	x			x	x			x	x					
American Creek Cooperative	92S	30		x			x				x						
Lake Platte Cooperative	93S	320	100	x			x	x		x	x	x	x	x			
Fort Randall Reservoir (14 areas)	95S	3, 310	118, 000	x	x	x	x	x	x	x	x	x	x	x	x		
Lake Corsica Cooperative	96S	120	80	x			x	x			x	x	x				
Fish Lake Cooperative	97S	60	800	x			x	x		x	x		x				
Lake Mitchell Cooperative	98S	70	900	x			x	x	x	x	x	x	x				
Lake Hanson Cooperative	99S	30	100	x			x	x					x				
East Vermillion Lake Cooperative	102S	60	550	x			x	x			x	x	x				
Dells of the Sioux Cooperative	104S	30		x			x	x					x				
Palisades State Recreation Area	105S	52		x			x	x		x			x				
Lake Alvin Recreation Area	107S	20	30	x			x	x			x	x	x				
Union County State Park	111S	124		x			x	x		x							
Lewis and Clark Lake (Gavins Point Dam) 12 areas	113S	1, 834	33, 000	x		x	x	x	x	x	x	x	x	x	x		
Monuments: Historic:																	
Fort Sisseton State Park	23S	10		x			x	x	x								
Mentor Graham	52S	1		x			x										
Forest: De Smet State Forest	41S	152		x			x	x	x	x				x	x		
MAJOR QUASI-PUBLIC AND PRIVATE																	
Recreation area: Ghost Hawk Campground (Rosebud Reservation)	85P	20		x			x	x	x	x			x		x		
Monument: Historic: Mellette House	31P	1		x			x										



Indians and Their Resources

Although many people think of the Sioux as the Indians of the Great Plains, they are actually relatively recent migrants to that part of our country. The Arikara, or Ree Indians were the first "citizens" in the area known today as South Dakota. They too were migrants, following the Missouri River in the 17th century to settle below the mouth of the Cheyenne River, becoming planters and buffalo hunters. Continual warfare and disease eventually diminished their ranks and forced them to flee.

The Sioux tribes came later, driven from the forests of Wisconsin and northern Minnesota by the armed Chippewa who in turn were being pressed by whites from the east. Before another century had passed, the Sioux tribes had established their claim to all the lands now comprising South Dakota.

At various periods other major Indian tribes also occupied the South Dakota region—the Arapaho, Cheyenne, Kiowa, Ponca, Hidatsa Mandan, Crow, Omaha and Winnebago lived for a time on the Crow Creek Reservation before settling in Wisconsin and Nebraska.

Indians and the White Man

Early encounters with the white man helped to acquaint the Sioux with the profitable enterprise of trapping and fur trading. With the coming of the steamboat up the Missouri River, trade with the white man increasingly influenced Sioux patterns of living.

By 1857 agriculture had become important as land companies brought new settlers into the area. The Federal Government entered a period of treatymaking with the Dakota tribes to secure lands needed for white farmers. The first such

This Sioux Indian Chief, dressed in colorful regalia, transmits the flavor of the past to the modern-day observer.

treaty was made in 1851 at Traverse des Sioux, St. Paul, Minnesota, whereby the Sioux relinquished nearly all of their lands in Minnesota east of Lake Traverse and all lands in South Dakota east of the Big Sioux River. By subsequent treaties the Indians ceded nearly all lands between the Big Sioux and the Missouri and the lands to the east and northward into North Dakota.

In 1868, seven years after the creation of the Dakota Territory, the Great Sioux Reservation was established by treaty, assigning to the Indians all of the lands in South Dakota west of the Missouri River as a permanent reservation. In return, the Indians released all lands east of the Missouri except for those occupied as reservations by the Crow, Creek, Sisseton, and Yankton bands.

The Sioux lived in peace on their vast reservation until the discovery of gold in the Black Hills brought them new problems, and eventually the western Sioux in Dakota went on the warpath. Incensed by the violation of their treaty as prospectors and settlers rushed into the Black Hills, the Sioux retaliated in an uprising led by Red Cloud, their formidable chief. The intrepid Red Cloud forced the Army to abandon its forts and roads north of the treaty line and to close the Bozeman trail by which the settlers entered the region. This was one of the few times in American history when an Indian leader fought the United States soldiers on equal terms, defeated them, and made the Army meet his demands.

But Red Cloud's accomplishment was merely a prelude to the loss of more Indian land—all that lay between the forks of the Cheyenne River, including the Black Hills and all lands west of the 103rd meridian. Continued unrest among the Indians led in 1876 to the climactic Battle of the Little Bighorn—and the annihilation of General George A. Custer and the Seventh Cavalry.

By an act of 1888 and subsequent amendments, six separate reservations were carved out of the Great Sioux Reservation. Over the years, agreements with the Indian bands reduced the once-vast land base still further. The surplus lands thus gained were placed in the public domain. Division of the Dakota Territory in 1889 was followed by the establishment of the States of North Dakota and South Dakota and, a year later, by the last armed conflict between the Indians and settlers of South Dakota. The subjugation of the Indians was hastened by the collapse of their native economy; buffalo, the Indians source of material and spiritual benefits, had been erased from the land, leaving the Indians dependent on the protection and distribution of rations by the white man. The spread of a new cult, the Ghost Dance, and the assembling of bands for ceremonies to bring back dead ancestors and the buffalo through spiritual power led to the apprehension of Indians by Indian agents and the army. An attack by Custer's old unit, the Seventh, upon a band en route to Standing Rock Reservation resulted in a massacre of 200 Indians at Wounded Knee on the Pine Ridge Reservation.

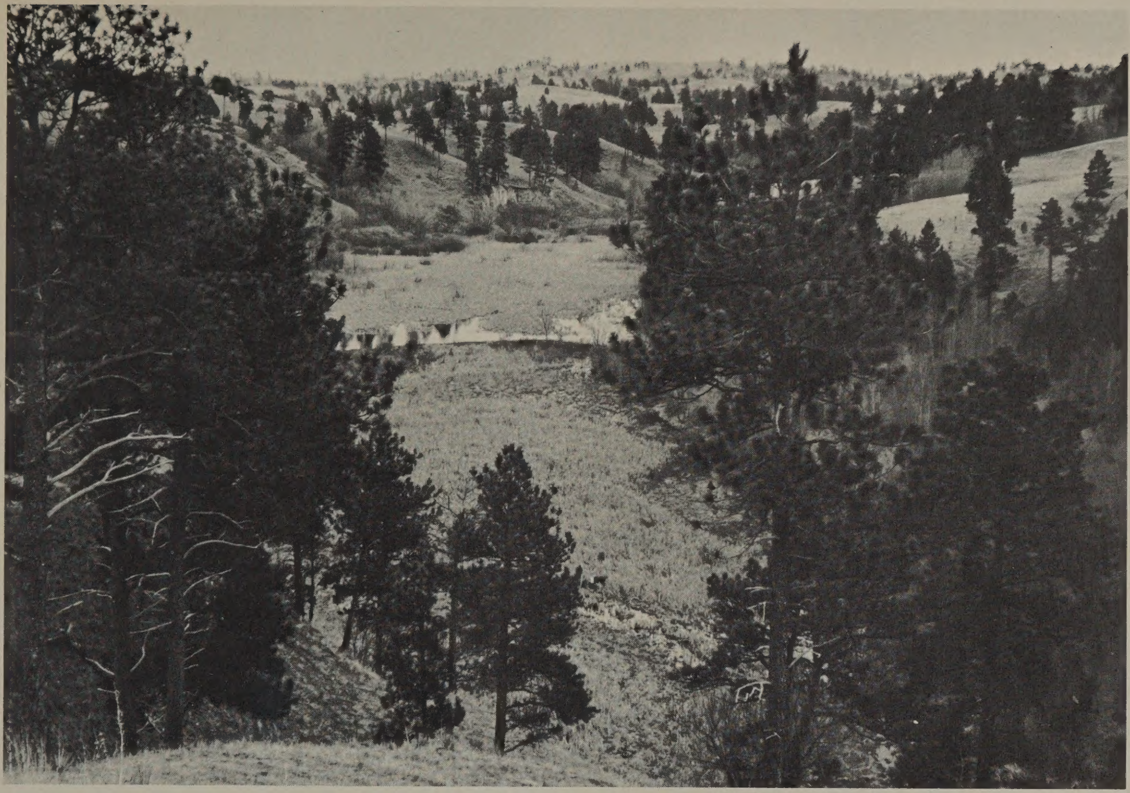
Lands

Of approximately 4.8 million Indian-owned acres in South Dakota today, nearly 2 million acres is tribal land. The remainder is allotted to individual Indians or their heirs. Altogether, the Indian lands comprise about 10 percent of the total area of the State.

The large number of band and subband divisions of the Sioux tribe, although little changed since the Indians first entered South Dakota, are represented on nine reservations: Cheyenne River; Flandreau; Crow Creek; Lower Brule; Pine Ridge, which lies partly in Nebraska; Rosebud; Yankton; Sisseton; and Standing Rock, which extends into North Dakota. Pine Ridge, with its more than 1.5 million acres, is the largest of the South Dakota reservations; Cheyenne River follows closely with more than 1.4 million acres; and the Rosebud Reservation contains nearly 1 million acres.

Nearly 28,000 Sioux live on or near the reservations, supporting themselves primarily by agriculture or stock-raising. But the land is poor in many places, and many of the most productive sites have been leased to non-Indians.

As a result of the land-takings for construction of Big Bend Dam and Reservoir, the Crow Creek and Lower Brule Sioux tribes received



Ten percent of South Dakota's land area belongs to the Indian inhabitants, the original settlers of the State. Pine Ridge Reservation, near Aberdeen, contains many areas which still exist in virtually untouched beauty.

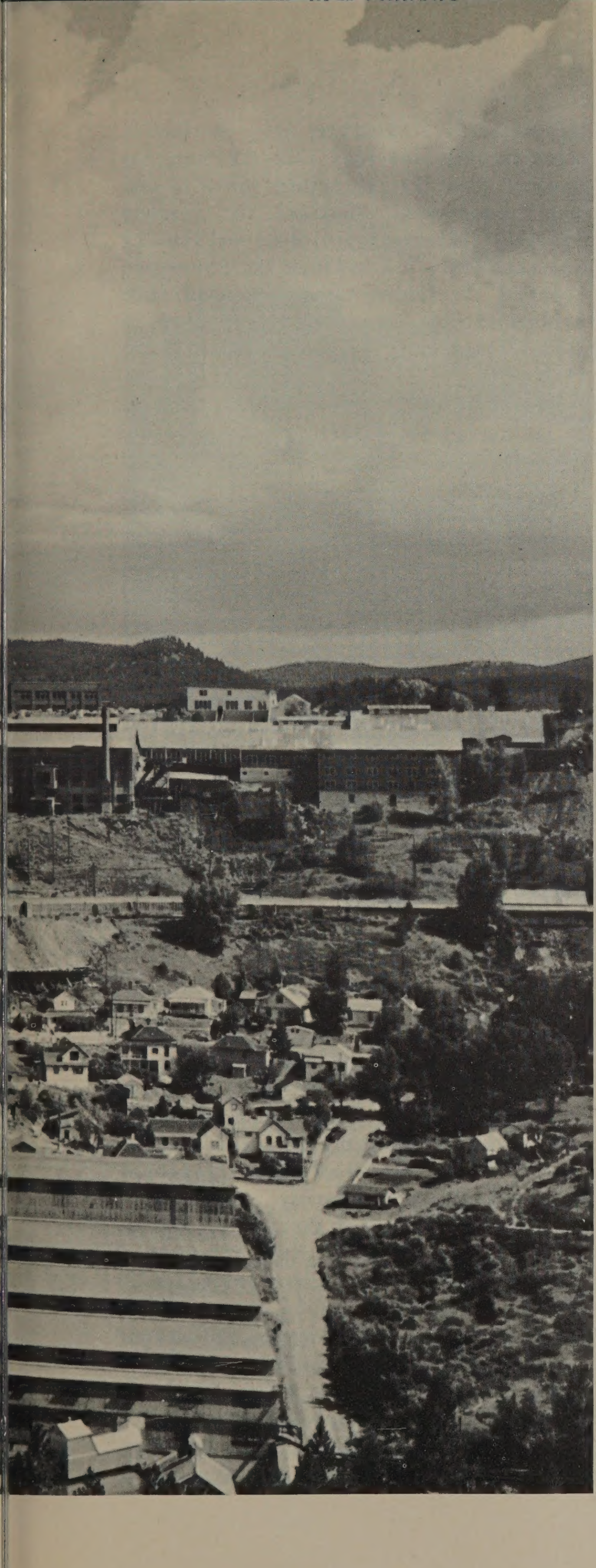
appropriations of approximately $4.5 million and $3.3 million respectively in 1962, in compensation for their lands and for the rehabilitation, and the social and economic development of the tribes. In each instance the tribal councils adopted programs for utilizing these funds in family improvement, community development, ranching and farming, land purchase, industrial development, and education.

Natural Resources

Indian reservations in South Dakota which adjoin large bodies of water formed by Gavins Point, Fort Randall, Big Bend, and Oahe Dams have an excellent potential for outdoor recreation development and most tribes have initiated modest recreation programs. Pine Ridge Reservation, located near the Black Hills and Mount Rushmore, offers picnicking, fishing, boating, waterfowl hunting, and the opportunity to visit Wounded Knee Battlefield. The operations on Rosebud Reservation are more extensive, including the tribally owned Crazy Horse Canyon Park, guided horseback tours, camping at Ghost Hawk Camp, fishing, swimming, and other water activities. Cheyenne River, Crow Creek, and Lower Brule Reservations provide fishing, boating, and waterfowl hunting.

The Indian lands show very little mineral development. Though nine oil and gas leases are in effect on the Cheyenne River Reservation, none have been exploited. Aside from one small coal-mining permit currently in use, also on the Cheyenne River Reservation, only sand, gravel, and clay are produced on Indian lands in the State.

There are few commercially valuable forest lands on the reservations in South Dakota. Of the 325,000 acres of forested Indian lands in the State, notably in the Pine Ridge and Rosebud Reservations, only 2,000 acres are classified as commercial.



Mineral Resources

Though not one of the leading States in mineral production, South Dakota boasts a variety of mineral resources including petroleum, uranium, stone, sand and gravel, clay, cement, and gold. The value of the State's mineral output has increased in recent years to more than $55 million annually. Gold accounts for more than a third of this figure, with sand and gravel next in economic importance followed by stone, cement, clay, and uranium ore. Together these commodities account for 98 percent of the State's mineral value.

Nearly all of South Dakota's 67 counties report mineral production, with the principal concentration found in and around the Black Hills. The principal mineral-producing counties—Butte, Custer, Grant, Harding, Lawrence, Minnehaha, and Pennington—each produce more than $1 million worth of minerals in a single year.

Gold

South Dakota gold has contributed greatly to the economy of the State and the Nation, but perhaps its most important contribution has been to American history. If it were not for South Dakota gold, some of the most colorful episodes in American history would not have taken place, and George A. Custer might have died in his bed of old age.

The events that were to immortalize Custer—and claim his life--began in early July, 1874, when he and a thousand men rode out of Fort Abraham Lincoln located in what is now North Dakota. The men headed south to reconnoiter the Black Hills, a mysterious region greatly revered by the Indians as the home of powerful spirits. The fact that the expedition was technically illegal—the Black Hills had been recognized by treaty as the exclusive property of the Sioux—did not deter the flamboyant cavalry commander.

Penetrating to the heart of the Hills, Custer set up camp near what was to become the town

Homestake Mine is a major contributor to the economy as well as a living testimony of the "Dakota Boom."

that bears his name, and led a small exploration party down French Creek. One member of the group was the prospector Horatio Nelson Ross, who found the first gold in the waters of the small stream. Not one to conceal good news, Custer included a glowing account of this discovery in a special report sent to General Terry in St. Paul—and soon the whole world knew.

The find, which occurred as the United States struggled to recover from the financial panic of 1873, sent fortune hunters racing for the wealth of the Black Hills. The army tried, with little success, to keep them out, while the Sioux, perfectly aware of what was taking place, grew nervous. Pressure was applied from Washington to make the Indians agree to a revision of the treaty that had made the Hills theirs. Negotiations soon broke down and the anger of the Indians manifested itself in war. When the fighting was over, both the Black Hills and the gold had changed hands, and the white man was left in possession of one of the richest gold-producing areas in the world.

A gold discovery with a happier history was made in the early spring of 1876 by a trio of prospectors. Their "find" eventually became the world-famous Homestake Mine, whose present output supplies roughly 40 percent of the Nation's total gold output.

Probably none of the men involved in the early Homestake claim knew how rich the deposits they were working really were. Today, when few gold mines have managed to survive the battle against increasing costs of operation and dimishing grades of ore, the Homestake still produces over $20 million worth of the yellow metal each year. The largest gold mine in the Western Hemisphere, its shafts penetrate more than a mile down into the rock. Nearly all of the more than $800 million in gold produced by South Dakota since 1876 has come from the Homestake Lode. If the careful and farsighted management that has characterized its operations continues, productivity should be assured for years to come.

Other Metals

Next to gold, uranium is South Dakota's most valuable metal product, although it has been mined for a far shorter time. Production began in 1952, and since then the State has produced more than $7 million worth of uranium concentrates. Most of the uranium operations today are in Fall River and Harding Counties, with a few in Custer and Pennington Counties. In Harding County, uranium oxide is obtained from uraniferous lignite which is burned to increase the concentration of the oxide.

Since 1876, South Dakota has produced about $9 million worth of silver, mostly as a by-product of gold mining. Yearly silver output is now about $150,000, almost entirely from the Homestake Mine.

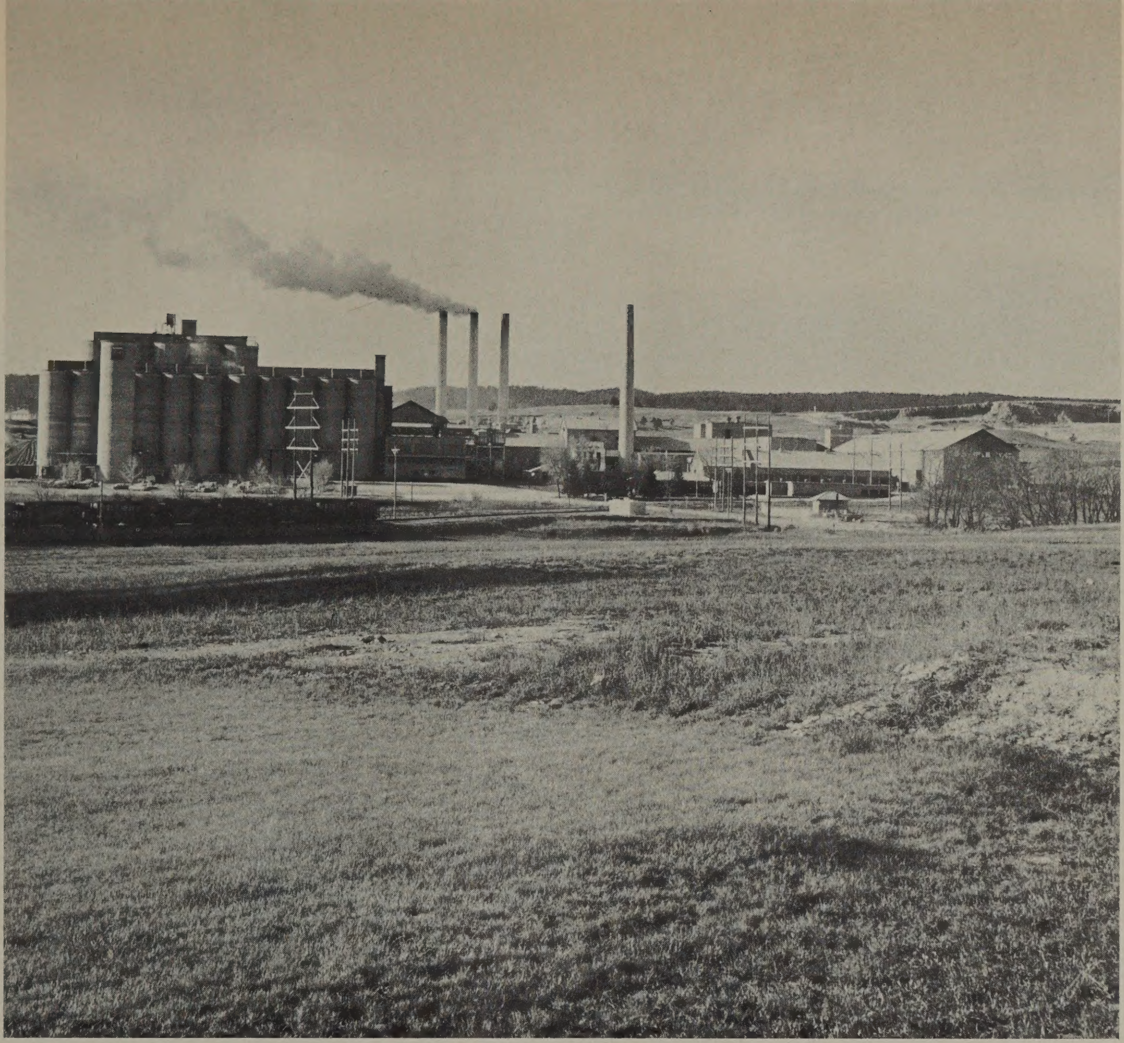
South Dakota was the world's principal source of lithium ores for more than half a century, and has also produced sizable amounts of beryllium ores. Both ores are found in the pegmatite deposits of the Black Hills.

A variety of other metals are or have been produced in small quantities in South Dakota including lead, vanadium, iron, copper, tin, and tungsten. In many instances, operations fluctuate according to demand—shutting down temporarily as demand falls, and reopening again when it rises. Although not yet widely exploited, some of the State's resources of iron and low-grade manganese have mining potential. Private ingenuity and technical application are the keys to future exploitation of these resources.

Nonmetallic Minerals

Sand and gravel have become so indispensable to the modern economy of South Dakota that they are produced in larger volume than any other mineral product in the State. Deposits, created by the combined effects of natural erosion—water, wind, gravity, and temperature—are being mined in almost every county to provide materials for highway construction throughout the State. Yearly production is valued at more than $16 million, and cumulative output since 1889 totals about 260 million tons and is worth almost $135 million.

Approximately $7 million worth of stone is produced each year in South Dakota. Most of this material is crushed limestone and sandstone from Hanson, Minnehaha, and Pennington



This stone-cement plant, located in Rapid City, processes the limestone from the nearby quarry for use in construction.

Counties. Several companies in Grant County produce dimension granite for monuments and building construction, while some dimension limestone is produced in Pennington County. Although dimension stone accounts for only a small percentage of South Dakota's stone output in terms of tonnage, it represents over a third of the total in value.

Although most of South Dakota's cement production is used within the State, significant quantities of both portland and masonry cement are shipped to other States. The annual value of cement output fluctuates, on the average, between $6 million and $7 million, with highway contractors and ready-mix concrete companies being the largest users.

A variety of clays are found in the State, the most valuable being bentonite, "the clay with a thousand uses," mined in Butte County. Total clay production in a recent year was valued at nearly $2 million.

Other nonmetallic minerals produced in South Dakota, most of them in relatively small amounts, include feldspar for the glass and ceramic industry, lime, gypsum, mica, and gem stones. Future expansion of many of these mineral products depends on development of new uses and new markets for the known mineral resources.

Although they are of minor importance to the economy of the State, gem materials and semiprecious stones bring increasing numbers of collectors to the Black Hills. Specimens of rose quartz, varieties of agate, cats-eye material, chalcedony, tourmaline, and petrified wood are among those commonly collected. Nearly all of the gem materials come from Pennington and Custer Counties and adjacent areas.

Pronghorn antelope, once threatened with extinction, are now plentiful, and a choice target for hunters.

Fish and Wildlife

Teeming wildlife populations have always made South Dakota a favorite hunting ground—first for the Indians, then for the fur trappers and homesteaders, and finally for today's sportsman. Like other great grassland areas of the world, the State's high plains support an abundance and variety of wildlife species.

White men first explored this area in 1742. Soon French fur traders plied the wide Missouri in search of beaver for the fashionable hats and coats which could be made from their pelts. In the century and a half that followed, the successive waves of mountain men, railroaders, homesteaders, miners, and loggers opened the frontier and decimated the herds of bison, antelope, deer, and elk. By the turn of the century big game was scarce and hunters concentrated on prairie grouse and waterfowl to fill the larder, stock the meat markets, and provide shooting sport.

Territorial laws in 1879 extended token protection to some species even then becoming scarce, but not until 1909, when the first State game and fish agency was created, did the downward spiral of wildlife populations begin to slow. State game and fish wardens were appointed, fish hatchery programs were initiated, and a few years later the State embarked upon its now-famous ringneck pheasant intoduction program.

Since those first restoration efforts, the State's fish and wildlife programs have made tremendous strides. Scientific wildlife management

One of the almost-lost symbols of the American frontier, bison are now carefully protected and allowed to multiply.

techniques, wise protective measures, and vigorous habitat improvement programs are annually opening new opportunities to sportsmen in South Dakota.

Plentiful Game

As late as the 1930's, successful South Dakota deer hunters were rare enough to be listed each year in the State's game and fish magazine. By the late 1940's, however, the situation had changed radically, and herds were so large that reduction programs became necessary by the 1950's in the Black Hills. Today, seasons are held statewide, with success for nearly 30,000 resident deer hunters averaging more than 70 percent. Separate deer seasons are now held in the Black Hills, the western prairies, and the region east of the Missouri River. The Black Hills area, inhabited by both mule and white-tailed deer, demands intensive management because of the combined problems of food, terrain, crop depredation, and migration.

In 1924 the U.S. Biological Survey, predecessor of the Bureau of Sport Fisheries and Wildlife, estimated that only 400 pronghorn antelope remained in South Dakota. State programs—financed in part with Federal funds—to trap and transplant the pronghorns to suitable ranges have made annual seasons possible in recent years. The pronghorn population now numbers about 30,000, the third largest State herd in the country. Up to 10,000 permits are issued annually and from 90 to 95 percent of the hunters get their pronghorn.

The last Audubon bighorn fell to a poacher in the South Dakota Badlands in the mid-1920's. An aggressive program is now underway to adapt the Rocky Mountain bighorn to the buttes and badlands of western South Dakota. For the present, however, this game-hunter's prize must remain "out of season." Elk herds, re-established after near-extinction are available for limited public hunting in Custer State Park. Some also occur in Wind Cave National Park and the Black Hills. A herd of 200–300 mountain goats—stocked from the Lake Baniff, Canada area—now live in the roughest part of the Hills in the vicinity of Harney Peak. This is the farthest east the species is found.

South Dakota has also fought a successful battle against the disappearance of several other varieties of wildlife.

Small game is abundant for the hunter and sportsman. Furbearers, such as mink, muskrat, beaver, jackrabbit, raccoon, skunk, weasel, fox, and bobcat add several million dollars each year to South Dakota's economy. South Dakota still has a few of the rare black-footed ferret.

Feathered Wildlife

An outstanding success story in South Dakota's game management program is the ringneck pheasant. First efforts to introduce the colorfully plumed bird were made by private citizens and bird fanciers in the early 1890's. In 1914 the State Department of Game, Fish and Parks began a 5-year program to release about 10,000 pheasants; it declared the first open season in 1919. For the past two decades, the State's pheasant flock has reached annual peaks of 10 to 20 million birds, with an estimated 70 million harvested by hunters since the first open season.

Most of the State's huge pheasant flock is concentrated east of the Missouri River. Since 1930 the daily limit on pheasants has seldom been less than three birds. Pheasant hunters outnumber every other kind of sportsman in South Dakota, with resident small game license sales totaling about 130,000 a year and an average of nearly 50,000 nonresidents coming into the State annually to hunt the Nation's largest pheasant flock. A large part of the license income from small game hunters from out-of-State is earmarked by the State for the acquisition and development of wildlife production areas and public shooting grounds.

In recent years research and management of grouse in South Dakota have been intensified as these birds gain in importance to the hunter. Pinnated grouse populations are still scarce, but the sharptail, sage grouse, and ruffed grouse have increased steadily. The Hungarian partridge of northeastern South Dakota is gaining in importance as hunters learn how to hunt this species, while the elusive bobwhite quail still remains a hunter's bonus.

Another highly successful introduction is the Merriam turkey, first released in 1948 and now scattered through much of western South Dakota. Annual hunting seasons for this bird have been held since 1955. The State is continuing its aggressive program of testing other upland game birds for their adaptability to South Dakota conditions. Tops on the list at present are the chukar partridge and valley quail.

Wildlife Refuges

Ancient glacial action left large areas of South Dakota dotted with shallow marshes and potholes which became traditional nesting and breeding grounds for migrating waterfowl. The Bureau of Sport Fisheries and Wildlife administers six refuges primarily for waterfowl in the State, totaling more than 20,000 acres: Sand Lake, Waubay, Belle Fourche, Lacreek, Pocasse, and Lake Andes National Wildlife Refuges. The refuges attract huge flocks of ducks and Canada geese each spring and summer as well as grouse, partridge, pheasant, whitetail deer, and many species of small animals. Trumpeter swans, introduced on the Lacreek Refuge several years ago, produced the first brood of wild cygnets to be hatched east of the Rocky Mountains in the past 80 years.

South Dakota is one of the top four States in waterfowl production—though this production has suffered heavily where agricultural drainage has dried up wetland breeding grounds. Both the State and the Federal Government have programs to purchase or lease outstanding wetlands for wildlife conservation and public use. Waterfowl hunting is heaviest east of the Missouri, with the most productive wetlands located in the northeast quarter of the State. The State's goose hunting is concentrated primarily around Federal refuges and the State and Federal reservoir area.

Fishery Resources

Despite South Dakota's classification as a high plains or prairie State, its waters offer an unusual variety and abundance of fish. Water resources of the State include more than 250 natural lakes, 1,000 large reservoirs built during WPA days, four massive Missouri River main-stem reservoirs, eight river systems, and several hundred miles of trout streams in the Black Hills. More than 160 natural lakes offer good angling for walleye, northern pike, large-mouthed black bass, and panfish. Most of these lakes are in the northeastern counties of South Dakota. The Black Hills area has several hundred miles of good trout streams and many trout lakes. One-third of the WPA reservoirs still provide good fishing, as do many of the 90,000 stock-water dams scattered from one end of the State to the other.

About 110,000 residents and 45,000 nonresidents purchase fishing licenses in South Dakota each year.

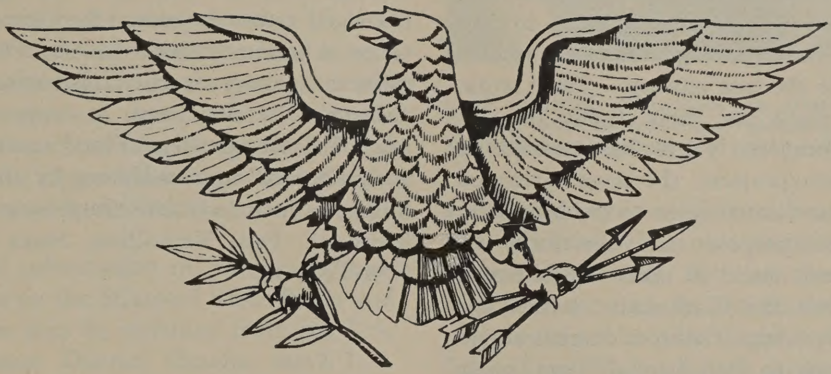
The four main-stem reservoirs on the Missouri River offer new fishing opportunities as well as many challenges to the State's fish managers. Top-ranked as fishing spots are the Oahe Reservoir and Lake Sharpe, formerly known as Big Bend Reservoir. Fish are so plentiful in the reservoirs that the State Department of Game, Fish, and Parks says fishermen are unlikely to harvest as much as 1 percent of them; commercial fishing may be introduced under the State's rough fish control program to prevent overpopulation of the lakes. A recently-developed lake above Big Bend Dam may become the location of a good cold-water fishery which is unique in this prairie region.

The State operates fish hatcheries at Pickerel Lake and Rapid City, while the Bureau of Sport Fisheries and Wildlife administers national fish hatcheries at Spearfish and Gavins Point—the latter hatchery being one of the largest hatcheries in the world.

Although seldom thought of as a commercial-fish producer, South Dakota has a commercial fishery dating back to 1913. Production has increased until in recent years commercial fishermen have taken over two million pounds annually from the lakes and reservoirs of South Dakota. It is estimated that the gross value of the catch to the fishermen varies from $90,000 to $150,000 per year.

The term "rough fish control" is generally applied to South Dakota's commercial fishery, because of its function of removing nongame species for the benefit of sport fisheries. Under strict control of the Department of Game, Fish, and Parks slightly more than 90 percent of the commercial catch consists of carp, buffalo fish, and sheepshead.

Programs of Federal Natural Resource Agencies



The natural resource functions of the Federal agencies represented in this booklet are extensive and detailed and are only briefly described. Additional information can be obtained by contacting the offices noted in the following programs section.

U.S. Army Corps of Engineers

The Corps of Engineers is a regularly constituted branch of the United States Department of the Army, with extensive military engineering and construction responsibilities. It is also actively engaged in planning and building projects for flood control, navigation, and water conservation as primary civil functions under Federal law.

The removal of snags and rocks from the Missouri River channel was one of the earliest functions of the Corps of Engineers in the Missouri River Basin, dating back to the steamboating days of the last century. Their work accomplished much for early traffic on the river. Since then, the Corps has assisted in dam construction projects, the most recent of which is the four-dam complex on the Missouri. These four multipurpose reservoirs form an almost continuous chain of lakes which bisect the State. Lewis and Clark Lake, formed by Gavins Point Dam near Yankton, extends about halfway upstream to Fort Randall Dam; with 540,000 acre-feet of storage. This lake is the smallest of the four. Fort Randall Dam, near the South Dakota-Nebraska State line, forms Lake Francis Case, provides storage for 6,100,000 acre-feet and reaches upstream to Big Bend Dam. Lake Sharpe extends from Big Bend Dam, located near Fort Thompson, to Oahe Dam, and has a capacity of 1,900,000 acre-feet. Oahe Reservoir, the largest of the four, begins near South Dakota's capital, Pierre, and extends almost to Bismarck and has an estimated storage capacity of 23,600,000 acre-feet.

The 1944 Flood Control Act approved the expansion of the general comprehensive plan for the control of floods and development of water resources in the Missouri River Basin. The basinwide plan, popularly known as the Pick-Sloan Plan, has four basic purposes: flood control, irrigation, production of hydroelectric power, and improvement of navigation on the lower Missouri River. Other allied benefits to the people of the valley and the Nation include improved municipal water supply and sanitation, soil erosion control, conservation of fish and wildlife, and public recreation advantages.

The program provided originally for the building of 103 dams and reservoirs, as well as the construction of local levees and floodwalls to protect municipal, industrial, and agricultural areas. Some 36 dam and reservoir projects have been placed in operation by the Corps and the Bureau of Reclamation, in addition to 250 miles of agricultural levees along the Missouri River.

Though the Corps is primarily a planning and construction agency of the Federal Government in the field of water resource development, its responsibilities also include emergency operations and assistance to stricken communities in times of flood or other disaster. Flood control projects to avert such catastrophies are administered by the Corps, in conjunction with other Federal agencies. Flood control projects authorized or now underway by the Corps of Engineers include channel improvements on the Redwater, Fall, Vermillion, Sioux Falls, and Grand Rivers.

Fort Randall, one of four dams in the Missouri Basin complex, forms Lake Francis Case, aids flood control, and supplies water for electric power and irrigation.

The Corps also makes examinations and surveys to determine the best methods of handling water resource problems, after initial action by the people themselves. If the problem merits serious consideration, Congress authorizes the Corps of Engineers to make an investigation, either through action of the House or Senate committees, or by a Congressional act. The investigation procedure includes research, field surveys, and economic, fish and wildlife, and engineering evaluations.

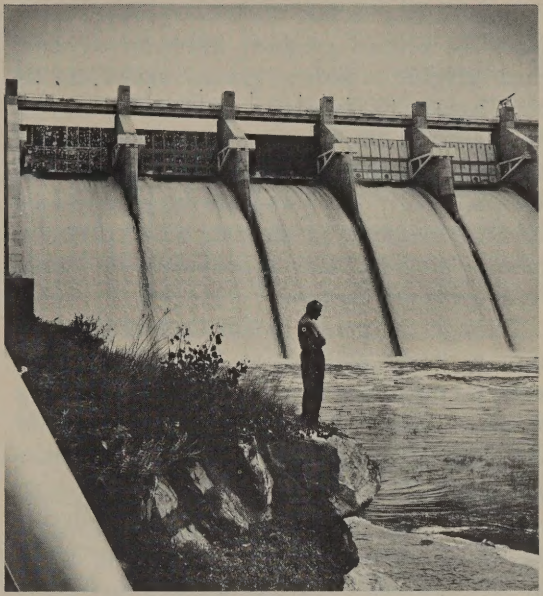
A study is being undertaken of the entire Upper Mississippi River Basin with a view to the full development of water and related land resources in the basin for navigation, flood control, major drainage, water supply, power, or other purposes. The study will be made in cooperation with the several other Federal agencies concerned with water resources as well as with the several States in the basin, and will extend over two or three years. Only the extreme headwaters of the Minnesota River, a tributary in the Upper Mississippi River Basin, lie in the State of South Dakota.

Additional information on Corps of Engineer projects on the Missouri River Basin and its tributaries may be obtained from the U.S. Army Engineer District Omaha, 6012 U.S. Post Office and Courthouse, 215 North 17th Street, Omaha, Nebr., 68102; on the Minnesota River Basin from the Division Engineer, U.S. Army Engineer District St. Paul, 1217 U.S. Post Office and Custom House, St. Paul, Minn., 55101.

Federal Water Pollution Control Administration

In South Dakota, water pollution has been somewhat less critical than in the more heavily populated and industrialized States. Nevertheless, the State, with Federal assistance as authorized by Congress, has participated in a program to curb and reduce the pollution of its waters.

The Department of the Interior's Federal Water Pollution Control Administration cooperates broadly with other water resource agencies and entities—Federal, State, municipal, and industrial. The objectives, as spelled out in the Federal Water Pollution Control Act, are to protect and conserve the Nation's waters for purposes of public water supply, propagation of fish and wildlife, recreation, agriculture, industry, and other uses. State responsibility in South Dakota is vested in a Committee on Water Pollution working through the Division of Sanitary Engineering, State Department of Health, in Pierre.



Light industrial-waste loads on rivers and streams, coupled with comprehensive planning, contribute to South Dakota's program of water pollution control.

Long-range comprehensive programs for water quality management—the "number one" requisite of the Federal program—are planned regionally or on a river-basin basis, and are aimed at permitting the use and reuse of water many times over. The programs focus on all present and anticipated water uses, including waste disposal and allowances for economic and population expansion. The necessary studies to blueprint such a comprehensive water pollution control program for the Missouri River Basin were begun by the Federal Water Pollution Control Administration in the last half of 1965. Prior to that, both State and Federal programs were coordinated for more than a decade by the Missouri Basin Inter-Agency Committee.

Since 1957, South Dakota's State water pollution control program has received more than $200,000 in Federal grants—authorized by the Congress to the extent of $5 million a year for all the States, apportioned on the basis of the State's population, pollution problem, and financial need. The grants are designed to help the State maintain an adequate water pollution control program and to stimulate its future funding for this purpose.

Through the grants, South Dakota has been able to carry out stream pollution studies, maintain inspection of waste treatment facilities to insure efficient operation, and plan ahead for the necessary installation of these facilities where projected for future growth and expansion.

Research and training in the Federal pollution control program takes place in the Administration's laboratories throughout the country while other research takes the form of grants to colleges, universities and other institutions and agencies. South Dakota's School of Mines and Technology at Rapid City is currently making use of the research grants to conduct studies in adsorption of surfactants on selected minerals.

Intelligent use of water pollution control preserves streams like Spearfish Creek, in the Black Hills, for use by fishermen and habitat for fish and wildlife.

South Dakota participates in a water pollution surveillance system which gathers information on the quality of waters in the Nation's major waterways. Two of the system's 130 sampling stations are located in South Dakota—one on the Big Sioux River below Sioux Falls, and the other on the Missouri River at Yankton. More than 40 physical, chemical, and biological constituants in the water are checked, analyzed, and reported upon by the system's stations and laboratories.

The most tangible evidence of water pollution control is in the streams made cleaner by proper treatment of sewage and other wastes discharged by cities and industries. The Federal program has awarded some $3.5 million in incentive grants to more than 100 South Dakota communities to help them build municipal waste treatment plants costing some $11.5 million. This has resulted in improved water quality in more than 1,500 miles of streams in the State. But the job is not yet finished; more than 140 South Dakota communities still must build treatment facilities or improve presently inadequate plants.

Under the Federal law, enforcement procedures to abate water pollution can be taken in interstate waters. The interstate Missouri River has been the subject of a series of enforcement conferences and public hearings, one of which involved the State of South Dakota. This was initiated in 1958 and cited the discharge of inadequately treated wastes from 11 municipalities and 18 industries and one Air Force base in the three-state complex (including Iowa and Nebraska as well as South Dakota) in the Sioux City, Iowa area. Following a public hearing in 1959, the required treatment facilities began to take shape and are now completed, or nearly so.

For further information regarding the Federal water pollution control program, address: Water Pollution Control Administration, Region VI, U.S. Department of the Interior, 560 Westport Road, Kansas City, Mo., 64111.

Fish and Wildlife Service

In no other inland State are the resource management activities of the Bureau of Sport Fisheries and Wildlife and the Bureau of Commercial Fisheries, the two Bureaus of Interior's Fish and Wildlife Service, more diversified than in South Dakota. Many of these Federal programs have been long established in the State, while others have been instituted to meet new and challenging demands on fish and wildlife resources which affect both the recreational and economic future of this prairie State.

South Dakota was one of the first States in which national wildlife refuges and Federal fish hatcheries were established. Thus, wildlife management and enforcement programs and professional predator control have been part of comprehensive programs, coordinated with State agencies, for decades. Fisheries management of Federal lands, investigations into commercial and sport fishing potentials of the new Missouri River reservoir system, reestablishment of nesting colonies of Canada geese and trumpeter swans, and research into improved methods for controlling crop depredations by nuisance birds, are some of the varied programs in South Dakota.

River Basin Studies Program

The River Basin Studies Program, one of the most comprehensive programs of the Bureau of Sport Fisheries and Wildlife, is concerned with the effects of Federal power, irrigation, and flood control projects on fish and wildlife resources. The Bureau works closely with the South Dakota Department of Game, Fish, and Parks to develop measures for the conservation and development of fish and wildlife resources for inclusion in projects of the Corps of Engineers, Bureau of Reclamation, Soil Conservation Service, and other Federal agencies concerned with water resources development.

This cooperation has resulted in the transfer to the State of about 27,000 acres of Federal land adjacent to eight Corps of Engineers or Bureau of Reclamation reservoirs for management of fish and wildlife resources. In addition, a new subimpoundment adjacent to the Oahe reservoir was financed and constructed by the Corps, making the new Pocasse National Wildlife Refuge possible. This refuge compensates in part for waterfowl habitat inundated by the reservoir. If present plans of the State and the Bureau of Sport Fisheries and Wildlife are realized, some 57,500 acres to be managed for fish and wildlife will become available in the Oahe Diversion Unit. Of these acreages, 20,000 would be managed by the State and 37,500 by the Bureau.

Other Programs

Fish and wildlife restoration programs, financed by Federal funds drawn from taxes on firearms, ammunition, and fishing tackle have made important contributions to sport and recreation in South Dakota. The State has invested nearly $4½ million in Federal Aid funds in its wildlife restoration program since the inception of the Pittman-Robertson (for wildlife) and the Dingell-Johnson (for fish) programs, with concentration on fish and wildlife management and production; wildlife land and public hunting and fishing sites; acquisition; and research.

Three Federal game management agents work with local wildlife officers to enforce wildlife laws and regulations. In addition, these agents participate in waterfowl-breeding ground surveys and banding operations; investigations of of crop damage reports and actions to alleviate such damage; and the issuing of Federal permits for collection, propagation, and possession of migratory birds.

Rodent and predator control is conducted by by the Bureau of Sport Fisheries and Wildlife under cooperative agreements with the State's Departments of Agriculture and Game, Fish and Parks. Pesticide surveillance and wildlife enhancement programs are a part of this activity.

The Nation's 18th Cooperative Wildlife Research Unit was established at South Dakota State University at Brookings in 1962, under joint sponsorship of the South Dakota Department of Game, Fish and Parks, South Dakota State University, the Wildlife Management Institute, and the Bureau of Sport Fisheries and

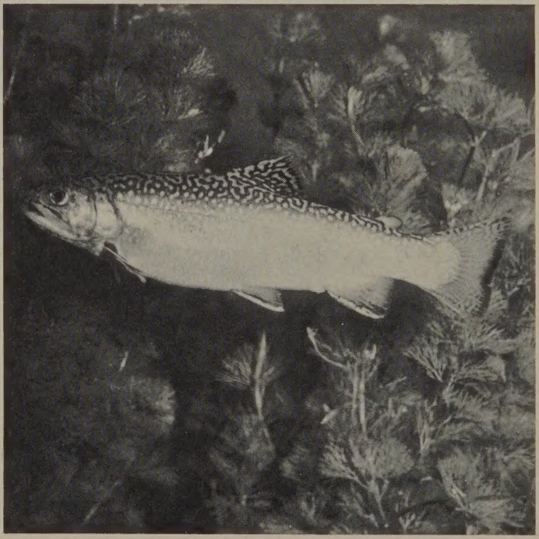
Wildlife. The services of the unit include training of personnel for careers in wildlife management, research on wildlife management problems, conservation activities for both youth and adult groups, and technical assistance to State and other agencies.

In 1965 a Cooperative Fishery Unit was established at South Dakota University by agreement among the University, the Department of Game, Fish and Parks, and the Bureau of Sport Fisheries and Wildlife. The Unit provides training for fishery scientists and conducts research valuable to State and Federal fishery management programs. Its extension program benefits a large segment of the public interested in recreational fishing.

Commercial Fishing

Commercial fishing has been conducted on a limited basis for many years in South Dakota. The first commercial fishing contract on the Oahe Reservoir, however, was issued by the State in 1964 and seven commercial fishermen produced 360,000 pounds of fish valued at $43,000. Research done on this reservoir shows definite possibilities for development of substantial fisheries for several species of fish such as buffalofish, river carp, suckers, sheepshead, and catfish.

One of several fresh-water species of fish in South Dakota, brook trout populate many anglers' havens.



Though limited hunting is permitted, elk are still carefully protected in State and National parks.

A fishery resource development program, based at Mobridge, is operated on the Upper Missouri River system by the Bureau of Commercial Fisheries. This program is designed to develop knowledge and understanding of the biology of commercial reservoir fish and the fluctuation in abundance of fish by season and locality; to test and recommend methods for harvesting fish economically; and to acquire data for achieveing optimum utilization of the fishery resource compatible with other reservoir uses. Investigations are conducted over the entire length of the reservoir upstream to the tailrace of Garrison Dam. Recently the Bureau acquired a new research vessel, the *Hiodon*, for this program. Tests with various types of fishing gear which may be applicable to existing reservoir conditions have been conducted, and results indicate commercial-level production is possible.

Further information on the activities of Bureaus in South Dakota may be obtained from the Regional Director, Bureau of Sport Fisheries and Wildlife, 1006 West Lake Street, Minneapolis, Minn., 55408 and from the Regional Director, Bureau of Commercial Fisheries, 5 Research Drive, Ann Arbor, Mich., 48103.

U.S. Forest Service

In the mountainous southwest corner of South Dakota lies the Black Hills National Forest. To the north, part of the Custer National Forest of Montana extends into the State. These, together with three National Grasslands located in the Central Plains area of South Dakota, comprise the Federal lands administered by the United States Department of Agriculture's Forest Service—a gross acreage of 2,272,295.

Black Hills National Forest covers an area of 1,519,531 acres, all but 199,467 acres of which lie in South Dakota. Under the administration of the Rocky Mountain Regional Forester with headquarters in Denver, Colorado, the forest is divided into 11 ranger districts each administered by a forest ranger under the general direction of the Forest Supervisor.

The 1,274,410-acre Custer National Forest, a small fraction of which lies in South Dakota, is a part of the Forest Service Northern Region and is administered by the Regional Forester headquartered in Missoula, Montana. Also administered from Montana is the Grand River National Grasslands, comprising 155,426 acres in northwestern South Dakota. Two other National Grasslands, covering a total gross acreage of 709,094, come under the administration of the Black Hills National Forest Supervisor.

The National Forest land of South Dakota contains 960,300 acres of commercial timberland, mostly ponderosa pine. Of historical interest is the fact that timber from the Black Hills National Forest—bought by the Homestake Mining Company on February 28, 1898—was the first ever sold from National Forest lands. Since then, more than 1½ billion board-feet of timber have been harvested from this forest.

Pastures within the National Forests and Grasslands in South Dakota provide full time and supplemental grazing for many thousands of large and small domestic range animals annually under paid permit. In a recent year, permits were issued for 64,167 horses and cattle and 21,181 sheep and goats, while as many more young animals grazed without charge.

The Forest Service has announced a program for intensified management and protection of the National Forests to meet demands anticipated by the year 1972 and long-term planning up to the year 2000. For South Dakota, this program means the planting of 43,000 acres of trees; the thinning and other improvement of timber stands on 397,000 acres; construction of 550 campgrounds and picnic units; revegetation of 11,648 acres of rangeland and construction of 145 miles of fence and 65 water developments; erosion control and soil stabilization on 2,200 acres and 200 miles of gullies and roads; intensified examination of mining claims; forest fire protection through reduction of hazardous accumulations of forest litter on 14,000 acres; and construction of 515 miles of multiple-purpose roads and 60 miles of trails.

U.S. Forest Service Corpsmen clear reject timber from the shoreline of Pactola Reservoir in the Black Hills to make more room for growth of the remaining timber.

Research

The Forest Service also conducts research in South Dakota on forestry and related subjects and offers cooperative assistance in forest management and protection to State and private landowners. The Rocky Mountain Forest and Range Experiment Station, with headquarters in Fort Collins, Colorado, maintains a research project location in Rapid City at the South Dakota School of Mines and Technology. Scientists conduct research in silviculture of the indigenous ponderosa pine, and study timber growth and utilization, wildlife habitat in the Black Hills, and improvement of water yields and soil stabilization.

Recently the Forest Service Rocky Mountain Station added to its Rapid City Laboratory analytical equipment designed to provide specific information—vital to this particular locality—about nutritive values of forage for livestock and game.

Other notable studies conducted recently by Forest Service researchers working out of the Rapid City Station include the effect on soil moisture of various degrees of thinning in stands of ponderosa pine and methods for improving Black Hills ponderosa pine log grades.

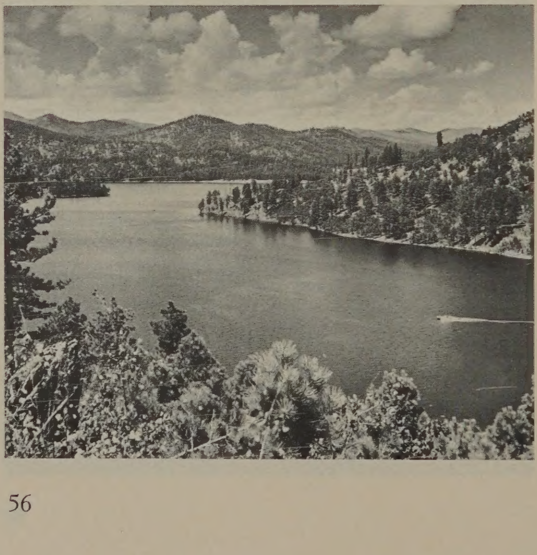
State and Private Cooperation

The small woodland owner in South Dakota, as elsewhere, is assisted in managing and protecting his holdings through his State conservation agencies. When requested, the Forest Service provides technical aid and cost-sharing in tree planting, control of forest insects and diseases, and forest and range fire protection.

Acres planted to trees by South Dakota property owners serve as barriers against the prevalant destructive winds of the Great Plains.

Most of the trees come from nurseries aided financially by Forest Service funds. In an advisory capacity the Forest Service also aids other tree-planting programs involving private land, assists the State Forester in the establishment of a new State tree nursery at Watertown for the distribution of some three million seedlings annually, and cooperates in the protection from forest fire of 2,827 wooded acres of State and private lands in South Dakota.

Intensified management and protection of South Dakota forest lands preserve the beauty of a recreation area, Dakota Lake, deep in the Black Hills National Forest.



In addition, woodland owners in the State are assisted in the planting, thinning, pruning, harvesting, and marketing of timber on more than 34,200 acres under a State-Federal cooperative program.

Additional information on Forest Service programs in South Dakota may be obtained from the following regional offices: Black Hills National Forest, Forest Service Office Building, Custer, S. Dak., 57730; Forestry Research, South Dakota School of Mines & Technology, Rapid City, S. Dak., 57701.

Geological Survey

The Geological Survey conducts several geologic and geophysical studies in South Dakota which are contributing to increased knowledge of mineral resources and greater understanding of the earth's composition, structure, and natural history.

A basic product of the geologist's studies is a geologic map. The maps are useful in determining the location, dimensions, and depth of economically valuable bodies of rock, such as ores or building stone; as well as areas in which such bodies might be sought. The maps show the depth to potential water- or oil-bearing beds beneath the surface, and the distribution of rocks which may have favorable properties for specific engineering uses.

Regional geologic research in progress includes detailed geologic mapping in the Four Corners 15-minute quadrangle, South Dakota-Wyoming, to determine the depositional history of various rock units as an aid in locating stratigraphic traps for oil and gas in the subsurface of the earth; and a detailed study of the chemical and physical properties of the Pierre shale—a marine shale which is widespread in the Great Plains region—to gain a better understanding of the distribution and concentration of economically valuable elements in the shale as well as its engineering potential.

Sedimentation and flood control are supervised by the Geological Survey, in cooperation with the Bureau of Reclamation, at Oahe Reservoir on the Missouri River.

In addition to general geologic investigations and mapping, the Geological Survey conducts research in economic geology—the geology of mineral and mineral-fuel resources. Investigations directly related to economic geology are in progress near Mount Rushmore in the Black Hills, for pegmatite deposits; in the southern Black Hills, for uranium; in Harding County, for uranium associated with lignites; and in the Williston Basin, for oil and gas. Survey geophysicists are interpreting the results of several airborne surveys of the earth's magnetic intensity to aid in the description of the existing and potential mineral resources of the northern and southern Black Hills.

Investigations in engineering geology provide information on a broad range of engineering problems, including the suitability of certain areas for urban development or for construction of dams, bridges, tunnels, or highways; or their unsuitability because of potential earthquake, subsidence, or landslide hazards. An engineering geologic study of the Rapid City area is in progress and a study of landslide phenomena in the Fort Randall Reservoir area is nearing completion.

Topographic Mapping

Topographic maps, another product of the Geological Survey, are a prerequisite to adequate planning for resource development. During the past 15 years an intensive program of 1:24,000-scale mapping (2,000 feet equals one inch) has been carried on in South Dakota, most of which has been accomplished in connection with the Department of the Interior's program for development of the Missouri River Basin. With the completion of projects now under way, 45 percent of the State will be covered by topographic quadrangle maps of the 7½-minute series (7½ minutes in latitude by 7½ minutes in longitude). South Dakota is completely covered by 17 maps of the 1:250,000-scale—about 4 miles per inch—series at present. An up-to-date map of South Dakota at 1:500,000 scale is now available.

Water Resources Investigations

The Geological Survey studies the water resources of South Dakota by collecting basic information through the hydrologic data network, by areal hydrologic or interpretive studies, and by research. Much of the work is a cooperative effort in which planning and financial support are shared by State and other Federal agencies. Parts of the program are conducted in cooperation with the South Dakota State Geological Survey, South Dakota State Water Resources Commission, South Dakota Department of Highways, Army Corps of Engineers, and Bureau of Reclamation.

The studies are concerned with both surface and ground water and with the supply available, variation in supply, location or distribution of the water supply, quality of the water, floods, and drought. The basic data collected, studies, and research findings are presented in publications of the Geological Survey, in reports published by the cooperating agencies, and in technical journals and other publications.

In the hydrologic data network continuous records of streamflow are collected at 105 gaging stations at key locations throughout the State; periodic measurements of streamflow for special purposes are made at more than 100 additional places; ground-water levels are measured regularly at some 300 wells; and water-sampling stations are maintained to monitor the chemical quality of the water at 36 locations—10 streams and 26 lakes or reservoirs—

and to measure sediment load at three locations. The basic data obtained from the hydrologic network provides essential information needed about water resources.

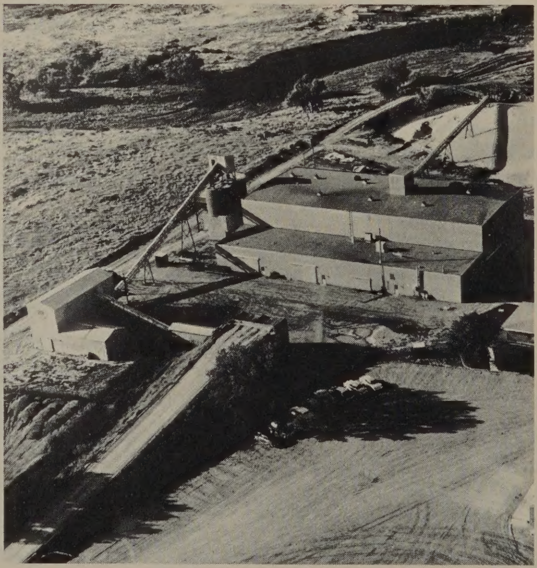
There is, in addition to the hydrologic network, a continuing Statewide program of area and interpretive studies that includes investigation of the magnitude and frequency of floods, determination of peak floodflow characteristics of small streams, definition of lowflow characteristics of streams, compilation of data on chemical quality of surface water, inventory of artesian wells and studies of selected aquifers, test drilling and measurement of observation wells in shallow aquifers, and geology and occurrence of ground water in the Dakota Sandstone.

Also in progress are area and interpretive studies for particular areas; geology and hydrology of glacial drift in the Big Sioux River basin; reports on geology and ground-water resources in Beadle, Clay, Campbell, and Bon Homme Counties, and Pine Ridge and Rosebud Indian Reservations.

Office of Minerals Exploration

South Dakota mining interests have participated actively in the minerals exploration assistance program which was introduced in 1951 under the Defense Minerals Administration and which has been continued since 1958 under the Office of Minerals Exploration, a part of the Geological Survey since 1965.

400 tons of uranium ore pass through this Edgemont mill daily to produce uranium concentrate and its byproduct, vanadium pentoxide, used in steelmaking.



During the first 14 years of this program, exploration work valued at more than $422,365 was authorized on 24 projects in South Dakota on which the Federal Government spent $172,429.

Discoveries have been certified on 10 of these projects. The principal minerals sought were beryl, columbium-tantalum, lead, mica, tin, uranium, and zinc.

Under the program, the Federal Government assists private industry in domestic minerals exploration by paying 75 percent of the cost of exploration for silver and 50 percent of the cost of exploration for all other mineral commodities listed in the OME Regulations.

Other Activities

The Branch of Mineral Classification of the Geological Survey engages in land classification activities related to the leasing of Federal land in South Dakota.

The Geological Survey supervises about 1,100 oil and gas leases in South Dakota covering 791,639 acres of public, acquired, and Indian lands. Annual production from these leases is in excess of $13,000 with royalty returns amounting to about $1,700.

Information on the various geologic and topographic maps, mineral resource maps, water resources reports, and other Geological Survey publications may be obtained by writing the Director, Geological Survey, U.S. Department of the Interior, Washington, D.C., 20240; information on water resources work in South Dakota may be obtained from the following district offices: Room 207, Federal Building, Pierre, S. Dak., 57501 or Room 231, Federal Building, Huron, S. Dak., 57350; additional information on the OME program may be obtained by writing to the Field Officer, OME, Geological Survey, Building 25, Denver Federal Center, Denver, Colo., 80225.

Bureau of Indian Affairs

The development of human resources on the reservations in South Dakota is equally a function of the Bureau of Indian Affairs as is its work to protect and develop the natural resources of the Indian lands held in trust. Programs to improve the social and economic conditions of the Indian people include education at elementary, secondary and post- secondary levels; vocational training and job placement for adults; stimulation of local business and industry through loans and technical aid to tribes; welfare services; and consultative services to tribal governments to encourage long-range economic planning and community development.

Members of the Sioux tribe invite spectators to recall the State's colorful history with traditional dances.

Education

Nearly 9,500 South Dakota Indian children are enrolled in school: 44 percent in schools operated by the Bureau; 38 percent in public schools; and the remainder in mission or other private schools. There are 343 South Dakota Indian youths attending colleges and universities, 115 on grants received from the Bureau of Indian Affairs to supplement scholarship funds available to them from tribal and other sources.

An adult education program conducted on the several reservations in the State assists adults who lack schooling or who wish to continue their education.

Summer programs were organized for Indian children on the various South Dakota reservations in 1960 and expanded in succeeding years. These activities are sponsored by the Bureau, the tribal groups, churches, and county personnel. They include camping, athletics, remedial school work, educational trips, arts and crafts, and folk dancing.

Employment Assistance

Since 1961 the Bureau's employment assistance service has helped over 2,000 single persons and family heads to obtain employment in South Dakota or elsewhere, or to prepare for better-paying employment through subsidized vocational training.

An additional feature of this program is on-the-job training, largely financed by the Bureau, in industrial plants located on or near the reservations.

Soil conservation is an important factor in greater crop productivity and development on Indian lands.

Economic Development

Economic development planning is premised on appraisal of reservation resources and markets to select the most promising projects for development. Seven such projects have been undertaken in South Dakota. Those completed include a study of the commercial recreation facilities needed in the Big Bend Redevelopment Area; a development plan for Pine Ridge Reservation; a study of commercially feasible employment- and income-creating opportunities at Indian Island Memorial Park, Standing Rock Reservation; and a market analysis for a motel-restaurant combination at the Rosebud Reservation.

Indian tribes are assisted in the compilation of reservation-wide economic development plans aimed at stimulating comprehensive economic and social improvement within each reservation. To date, the Cheyenne River, Crow Creek, Lower Brule, Pine Ridge, Rosebud, Sisseton, Standing Rock and Yankton Reservations have completed such plans.

The Bureau of Indian Affairs and the tribal groups work together to encourage the establishment of job-providing industries to meet the employment needs of Indians who prefer to live and work on their reservations. The Bureau serves as a catalytic agent, bringing together industries in search of new locations and tribal organizations seeking new industries to increase employment. Tribal industrial enterprises, often financed by loans from the Bureau's revolving credit fund, also do their part to help meet these needs.

A well-known manufacturer of fishing gear began operations on the Pine Ridge Reservation in 1961 and subsequently expanded to perform assembly operations at three places on the reservation. The plant employs nearly 200 Indians, full- or part-time, and provides a payroll of approximately $400,000 a year. When fully operative, it is expected to double its Indian employment and annual payroll.

Two small tribal industrial enterprises were established on Pine Ridge in 1963, and similar enterprises have been established by the tribes on other South Dakota reservations.

Housing and Welfare

Extending its services to Indian reservations in 1961 for the first time, the Public Housing Administration has approved applications submitted by six South Dakota tribal housing authorities for the construction of over 500 low-rent units for the Cheyenne River, Crow Creek, Lower Brule, Pine Ridge, Rosebud, and Standing Rock Reservations, and many of these constructions are completed or under way. The first such units are now occupied at Pine Ridge. Additional units specifically for the elderly also have been built on that reservation.

The Bureau has a welfare program on all of the reservations in South Dakota, providing general assistance to needy Indians who do not meet the specific eligibility requirements for public assistance under the Social Security Act. Social services are provided for Indians with serious social problems, and child welfare services for dependent, neglected, or handicapped children. Surplus foods, made available through the Department of Agriculture, are distributed monthly on each reservation.

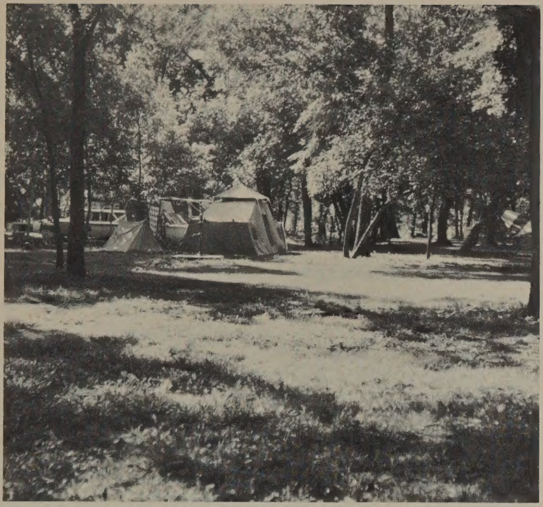
Law and Order

The Bureau of Indian Affairs assists the South Dakota tribes in their local law enforcement programs by furnishing criminal investigators, special officers, judges, and probation and parole officers to perform preventive and rehabilitative work as well as to furnish technical services for modernizing their codes of law. The South Dakota legislature enacted a law, signed by the Governor on March 15, 1963, that provides for assumption of complete civil and criminal jurisdiction under Public Law 280 over all reservations in the State. A voters' petition has resulted in postponement of the effective date (July 1, 1963) pending a referendum scheduled for the general election in the fall of 1964. This referendum defeated this jurisdictional law.

Conservation Programs

Efforts are being made to improve timber productivity on Indian lands in South Dakota. Early in the 1960's, the Bureau of Indian Affairs planted trees on over 1,300 acres; since then, additional funds have been used for further forest preservation and multiple-use development projects on the Pine Ridge and Rosebud Reservations.

The range resources of the Cheyenne River, Crow Creek, Lower Brule, Pine Ridge, Rosebud,



Camping facilities on reservation lands provide a source of revenue for South Dakota Indian tribes.

and Standing Rock Reservations provide year-round grazing for approximately 146,000 head of cattle. Over the past few years, Indian use of the reservation range has increased substantially and cash returns from grazing have risen accordingly. Recent soil and range resource inventories have provided the staff of the Bureau of Indian Affairs with information useful in lending assistance for range improvement to tribes and range users.

In a recent 3-year period the Bureau of Indian Affairs spent over $1.2 million on soil and moisture activities in South Dakota and completed soil inventories on more than 2.6 million acres of Indian land in the State. Range and pasture improvements have been achieved through the seeding and sodding of 45,800 acres in conjuction with controlling 3,017 acres of undesirable brush; building 661 miles of fence; and completing 505 water developments and ponds, all of which contribute to better use, management, or development of Indian range resources. Weed control on 262,000 acres of cropland associated with 90,000 acres of strip cropping, the use of more than 11,000 tons of fertilizer, planting of 45,000 trees, and the building of 34 diversion dams have contributed substantially to increased crop production and the checking of soil erosion.

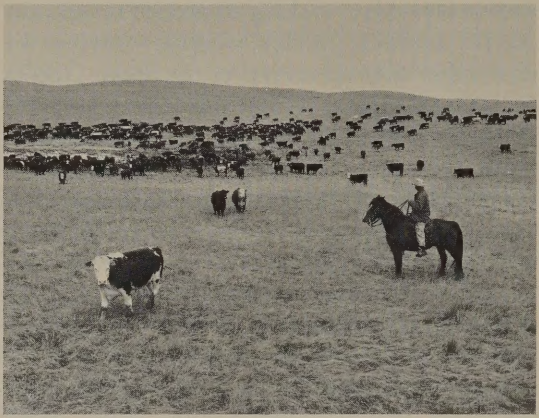
Conservation measures on Indian lands in South Dakota have shown a highly favorable cost-benefit ratio, making continued investment in this work a feasible venture. Studies are now under way on several of the South Dakota Indian reservations to determine the possibility of developing large irrigation projects on Indian lands.

The Bureau of Indian Affairs, in cooperation with the Bureau of Sport Fisheries and Wildlife and the State Department of Game, Fish, and Parks, is directing considerable attention toward improvement of the fish and wildlife reserves of the Indian reservations. The removal of trash fish and restocking with game fish have been accomplished on many small lakes on Indian lands. Since 1961 tourist visits to the reservations have increased substantially—from over 106,000 a year to nearly 112,000—and will continue to increase with the development to maximum potential of the available recreational facilities.

Additional information on Indians and reservations in South Dakota and the activities of the Bureau of Indian Affairs may be obtained by writing the Aberdeen Area Office, Bureau of Indian Affairs, 820 South Main Street, Aberdeen, S. Dak., 57401.

Bureau of Land Management

In South Dakota the Bureau of Land Management has responsibility for mineral, range, forest, wildlife habitat, and water resources on nearly 282,000 acres of public domain, mostly in the western half of the State. About 265,000 acres on plains and uplands are located in the northwestern corner, with the greatest acreages in Butte, Harding, Perkins, and Meade Counties. Though Bureau lands have little effect on the State's economy as a whole, they do have a significant influence on the local economies of Butte and Harding Counties. The lands, subject to years of homesteading and other entry, present an extremely fragmented and scattered land pattern. They are managed by the Miles City, Mont., district, with supervision from the BLM director in Billings, Mont.



A cattle rancher supervises his herd of yearlings as they graze on a lush range near Leola, South Dakota.

Grazing and Timber

Grazing on public domain lands is an important supplement in feeding livestock. In recent years, 366 grazing leases were issued on 259,071 acres of public domain for 57,120 horses and cattle and 89,102 sheep and goats. Rental fees totaled $27,490.

BLM lands support 6,000 acres of commercial forest and 10,000 acres of woodland with 15 million board-feet of standing timber. Ponderosa pine is the dominant species. Because this is a fire area, few virgin stands of timber remain; many of the stands are broken by mountain meadows. Though the timber has a limited commercial value—supplying only posts, poles, pulp, and mining props—it provides watershed protection, wildlife habitat, and aesthetic value.

Other Activities

Much of the public domain land has potential for a wide range of outdoor activities, from picnicking, hiking, and camping to hunting and fishing. Little use is now made of these tracts for recreation, but inventories are currently under way to identify, map, and post specific areas for public recreational use.

In the exemption area of the Black Hills a major problem has been the unauthorized use of mining claims for residential purposes. BLM is working on the problem and hopes to eliminate it with closer checks and regulations.

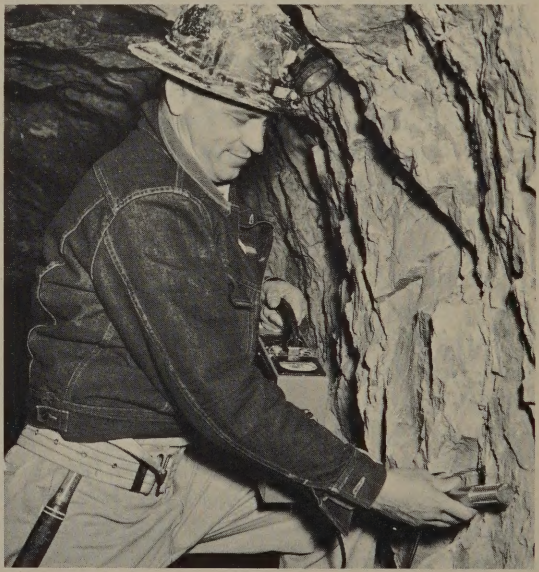
The Makotapi Project 5-year plan was developed in 1963 for the accelerated development, use and conservation of 237,513 acres of BLM land in northwestern South Dakota. These are generally well-blocked areas. A project office was established at Belle Fourche in October 1963 with five employees.

Other BLM-managed lands in South Dakota, are widely scattered, small, isolated parcels. The Bureau has established a program to classify these lands for retention for public use or transfer into private ownership. Tracts with particular recreation values are to be tied into coordinated state and local programs.

BLM also carefully supervises watersheds in the public domain and will continue to implement programs for development of vegetative cover and control of runoff.

Additional information on the activities of the Bureau in South Dakota may be obtained from the State Director, Bureau of Land Management, Crum-McKinnon Building, 1245 North 29th Street, Billings, Mont., 59101.

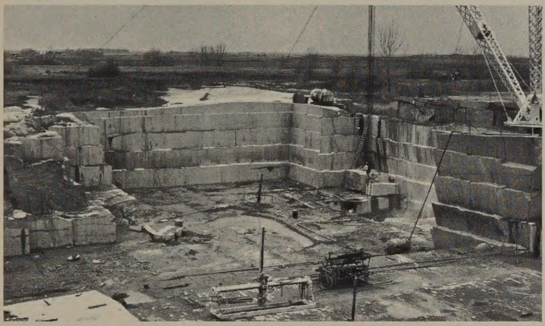
Bureau of Mines



A Bureau of Mines engineer "scans" uranium ore and estimates its quality with a Geiger counter. Uranium is the State's second most valuable mineral resource.

Activities of the Bureau of Mines in South Dakota, the Nation's No. 1 gold-mining State, are designed to make a maximum contribution toward assuring an adequate, dependable, and continuing supply of mineral raw materials, produced under conditions minimizing hazards to the health and safety of workers in the mineral industries.

Working closely with State officials and with all segments of industry, the Bureau conducts research in mining, processing, and utilization of mineral resources. Bureau personnel conduct courses in accident prevention, first aid, and mine rescue for mineral-industry employees throughout South Dakota, and periodically inspect the State's coal and lignite mines, advising mine operators on measures for eliminating hazards. In addition, through its extensive factfinding and reporting activities, the Bureau serves as a primary source of statistical, economic, and technological information on mineral resources and industries of South Dakota, the Nation, and the world.



High-quality granite, an important mineral resource, is extracted from a granite quarry in Grant County.

Although the Bureau has maintained no installations in South Dakota since 1961, when intensive research on pegmatite deposits of the Black Hills was completed, it conducts many field studies in South Dakota; in laboratories elsewhere, it performs research which helps the State's mineral producers keep abreast of changing technologies, needs, and opportunities in the Nation's mineral economy.

Petroleum Research

A wealth of information for South Dakota's oil industry has been supplied by Bureau scientists and engineers headquartered outside the State who are investigating problems in production, refining, and utilization. Intensive studies have been made of oil and gas reservoirs in the famed Williston Basin of South Dakota, North Dakota, and Montana. Modern computer techniques are being used to correlate the properties of South Dakota crude oils with geographic and geologic factors, and samples of crude oils from new discoveries are analyzed to provide a constantly increasing fund of knowledge for industry's use.

Coal Research

Bureau research on lignite is directed toward finding new uses and broader markets for the large solid-fuel reserves of the West and Midwest, including the lignite beds of northwestern South Dakota. Studies are underway to develop improved methods for drying, pulverizing, carbonizing, and gasifying this plentiful fuel, and to learn more about the potential uses for tars that can be derived from it. Strenuous efforts are being made to solve problems that have so far posed a barrier to widespread use of lignite at electric powerplants.

Bureau experiments have developed a promising soil conditioner-fertilizer, made by combining substances derived from lignite with standard plant nutrients, which is now being tested. Research is in progress to find ways of binding lignite char into briquets, to devise methods for using lignite in special-purpose carbon products, and in iron-ore processing.

A new process for gasifying lignite, developed through Bureau of Mines research and now being tested in a Bureau pilot plant, could lead to a wide array of new uses for lignite from the vast deposits of the Dakotas and Montana. Product gases may have uses as industrial fuel or in producing ammonia, fertilizers, alcohols, gasoline, oils, waxes, and chemical raw materials.

Mining and Metallurgical Research

Research applying modern theories, techniques, and instrumentation to mining problems common to South Dakota and other States is concentrated primarily in two continuing long-range programs that are of fundamental importance to the safe and efficient extraction of mineral resources: (1) development of engineering and mathematical principles applicable to mineral exploration and to mine development and operating problems, and (2) studies of "rock mechanics"—the behavior of rock under the stress of mining—as applied to ground control around mine openings.

In addition, Bureau mining research seeks the technological knowledge that will permit commercial development of promising South Dakota resources, such as the abundant pegmatites, or "giant granites" of the Black Hills. These rock formations—containing beryl, mica, and other important minerals—have been core-drilled and sampled by Bureau engineers, who have also conducted experiments in mining them.

Metallurgical research by the Bureau often complements its mining research program. For example, Bureau metallurgists have made significant progress in developing processes to recover beryl and other minerals from Black Hills pegmatites. Such studies also emphasize new techniques and processes for treating and utilizing South Dakota's large reserves of lean, or lower grade ores more effectively.

Mineral Resource Studies

Technical and economic studies are being made by the Bureau of Mines on mineral resources of South Dakota to identify deposits which can be developed with present technology and those which have potential for the future. In cooperation with the South Dakota Geological Survey, a broad-scale study now nearing completion—first of its type in the Rocky Mountain region—encompasses all mineral resources of the State and includes data on reserves, uses, and economics of the various commodities. Another investigation, also in the final stages, is a reconnaissance of South Dakota's iron deposits. In the Coyote State and in neighboring areas the Bureau is conducting studies of such commodities as copper, lead, zinc, silver, and their byproducts, clays and lightweight aggregates, pozzolanic materials, gold, and iron and steel scrap.

The shale taken from this mine in Pennington County is heated and used as lightweight concrete aggregate.

Bureau specialists also collaborate, under a cooperative agreement, with representatives of the State Geological Survey in collecting and publishing annual statistical and economic information on South Dakota's mineral products.

Additional information on the activities of the Bureau of Mines in South Dakota may be obtained by writing the Bureau of Mines, Department of the Interior, Washington, D.C., 20040.

Bureau of Outdoor Recreation

The Department of the Interior's Bureau of Outdoor Recreation administers a program of grants-in-aid to States and their political subdivisions for outdoor recreation planning, acquisition, and development. This program, which requires States to match available Federal dollars, was authorized by the Land and Water Conservation Fund Act of 1965. The Fund derives revenues from "pay-as-you-go" user fees and entrance charges at designated Federal recreation areas, sale of surplus Federal real property, Federal tax on motorboat fuels, and advance appropriations beginning the third year of the program.

The Bureau provides technical assistance to South Dakota in preparing the statewide out-

Jagged cliffs challenge even the skillful climber.

door recreation plan required for the State to qualify for the matching fund program. This plan will guide future outdoor recreation development by individuals, private organizations, cities, counties and units of the State government.

Chief duties of the Bureau of Outdoor Recreation as authorized by Public Law 88–29 are to cooperate with the States on outdoor recreation matters, promote coordination in Federal outdoor recreation programs, administer the grants-in-aid program, and develop a long-range, continuing nationwide outdoor recreation plan based on State, Federal, regional, local, and private plans. The Bureau manages no lands or recreation facilities. Its program is designed particularly to strengthen States in their key role of providing for the future recreation needs of their citizens.

South Dakota has named the Director of the South Dakota Industrial Development Expansion Agency, Pierre, S. Dak., as liaison officer to the Bureau of Outdoor Recreation. He serves as a contact between the State and the Bureau in State-Federal outdoor recreation planning, acquisition and development.

Additional information on the Bureau may be obtained from the Regional Director, Mid-Continent Region, Bureau of Outdoor Recreation, Building 56, Denver Federal Center, Denver, Colo., 80225.

National Park Service

The National Park Service administers four areas in South Dakota: Wind Cave National Park, Mount Rushmore National Memorial, and Badlands and Jewel Cave National Monuments.

Under its long-range development program the National Park Service will continue to improve all areas under its direction, including the planning and installation of more campgrounds, picnic areas, overnight accommodations, roads and trails, and recreation facilities. Further research and interpretive efforts will heighten the enjoyment of visits to scenic, historic, and scientific areas in South Dakota.

Future plans for Wind Cave National Park include the expansion of the visitor center and concessions building and reconstruction of the main park road.

Plans for Mount Rushmore include the enlargement of the concessions building to provide space for restaurant facilities.

At Badlands National Monument, additional camping facilities are planned, as well as the expansion of the visitor center, and the improvement of roads, trails, and utilities.

Work is now underway at Jewel Cave National Monument on a parking area, entrance road, and

Mount Rushmore National Memorial in the Black Hills forms an inspiring backdrop for the American flag, creating an unforgettable monument to our democracy.

water system, and work is scheduled to start soon on an elevator access to the cave. Future plans for the area include the installation of a new visitor center-administration building, as well as additional picnic facilities.

Additional information on programs of the National Park Service in South Dakota may be obtained from the Midwest Regional Office, National Park Service, 1709 Jackson Street, Omaha, Nebr., 68102.

Bureau of Reclamation

The Belle Fourche Project, approved by the Secretary of the Interior on May 10, 1904, was the first Federal irrigation project to be constructed in South Dakota. Construction began in 1905, and by 1908 water was being delivered to the lands of the project. The addition of a diversion dam and a storage dam in the following 3 years gave the project its present irrigable area of 57,000 acres, drawing upon water from the Belle Fourche River.

Since then, the Bureau of Reclamation has added projects on both major and minor waterways in the State. About 84,000 acres, or 72 percent of the irrigated land in South Dakota is in the drainage basin of the Cheyenne River. Besides the Belle Fourche Project, other Cheyenne River Basin reclamation developments are the multipurpose Angostura Unit on the Cheyenne River, with Angostura Dam and Reservoir, and several multipurpose dams and reservoirs including Keyhole Dam and Reservoir on the Belle Fourche River in Wyoming; Deerfield Dam and Reservoir on Castle Creek, a tributary of Rapid Creek, and Pactola Dam and Reservoir on Rapid Creek, a tributary of the Cheyenne River. In the Grand River Basin, the multipurpose Shadehill Dam and Reservoir have been constructed.

As a part of the Missouri River Basin Project, authorized by the Flood Control Acts of 1944 and 1946 and subsequent legislation for the conservation, control, and use of the water resources of the river basin, the Bureau of Reclamation is considering the development of about 625,000 acres of new land. The greater part of the potential development would be supplied from storage available in the huge main-stem reservoirs on the Missouri River constructed by the Corps of Engineers.

The Missouri River in South Dakota, with a north-south course of 547 miles, has been transformed by dams into a continuous chain of four large storage reservoirs—Oahe, Lake Sharpe, Lake Francis Case, and Gavins Point—with a combined capacity of 32,340,000 acre-feet.

The Bureau's proposed Oahe Unit extends east of the Missouri River to the eastern edge of the James River Basin, with plans for providing for the diversion of water from the Oahe Reservoir for irrigation of 495,000 acres of land, as well as for municipal and industrial use, fish and wildlife developments, recreation, and other benefits. Because Huron, South Dakota, had an immediate shortage of water for municipal and industrial uses, the James Diversion Dam on the James River has been constructed in advance of other features of the Oahe Unit. Later the diversion dam will also perform its irrigation function.

Twelve irrigation pumping units located along the Missouri River, with an irrigation potential in excess of 63,000 acres, have been under consideration by the Bureau. The water supply will come from the main-stem reservoirs or from the Missouri River itself.

The Angostura Unit, situated on the Cheyenne River on the southeastern slope of the Black Hills, was the first Missouri River Basin Project irrigation unit to reach the construction stage following passage by the Congress of the basin development program. Features of the multipurpose unit include Angostura Dam and Reservoir, the powerplant, and an irrigation system. The dam was completed in December 1949, with the initial delivery of water for irrigation made in 1953. The unit presently contains 12,000 acres of irrigable land.

The Shadehill Unit of the Missouri River Basin Project, located on the Grand River in northwestern South Dakota, was completed in 1951. Multiple functions of this dam and reservoir include irrigation, flood control, municipal and industrial water supplies, fish and wildlife conservation and recreation. After completion of the dam, plans for development of irrigation were temporarily deferred pending study of soil-water relationships. These studies have been completed and a definite plan for irrigation of 6,700 acres has been formulated. Construction of irrigation features depends upon local interest and authorization of the irrigation features by the Congress.

The seven powerplants on the main stem of the Missouri River will have a total installed capacity of 2,098,000 kilowatts, of which South Dakota's Oahe, Big Bend, Fort Randall, and Gavins Point Powerplants have a total installed capacity of 1,483,000 kilowatts. Gavins Point Powerplant is actually situated on the Nebraska side of the South Dakota-Nebraska boundary. The Bureau of Reclamation markets this power as well as power produced at other Bureau hydroelectric powerplants in the Missouri River Basin. In carrying out these marketing responsibilities, the Bureau has constructed an extensive electrical transmission system through the basin area.

Corn and cattle: each one increases the other's value.

Since 1953, the Bureau of Reclamation has constructed in South Dakota a network of about 1,250 circuit miles of 230-kilovolt steel-tower transmission lines with 31 substations. This system transmits, controls, and coordinates wholesale power delivery to 42 different customers in various load areas throughout the State. Bureau construction of about 200 miles of additional steel-tower transmission lines in the State was nearly complete when this book went to press.

The Garrison Diversion Unit, an important addition to the Missouri River Basin projects, includes irrigation development of 250,000 acres of land in the central and eastern portions of North Dakota and northeastern South Dakota. Of the land to be served by the new project, 55,500 acres are in South Dakota. The initial stage of Garrison Diversion Unit was recently authorized by the Congress. Ultimate development would expand irrigation to about 1 million acres.

Additional information on reclamation investigation and development programs in South Dakota may be obtained from the Project Manager, Missouri-Oahe Projects Office, Huron, S. Dak., 57350; or, the Regional Director, Region 6, Bureau of Reclamation, Billings, Mont., 59101.

Office of Saline Water

Citizens of Webster, South Dakota, began drinking vastly improved water following completion in 1961 of the Office of Saline Water brackish water conversion demonstration plant in that community.

The plant was constructed under the provisions of the Demonstration Plant Act of 1958, which provided for at least one demonstration plant for the treatment of brackish water to be located in the area generally described as the Northern Great Plains.

The plant utilizes an electrodialysis process of conversion to improve the quality of the water available in the Webster area by reducing the salinity of the water from 1,800 dissolved parts of salt per million parts of water to 350 parts per million. The maximum allowable for good drinking water is set at 500 parts per million.

The Webster plant, which produces 250,000 gallons of fresh water daily, was designed by the Interior Department's Bureau of Reclamation at Denver and was constructed by Asahi Chemical Industries Co. Ltd. at an initial cost of $433,470. Ground for the plant was broken May 19, 1961, construction was completed September 9, 1961, and the plant was dedicated March 20, 1962. Raw feed water for the plant is pretreated to remove inorganic iron and manganese by aeration and oxidation with potassium permanganate.

The electrodialysis process of saline water conversion is based on the fact that when salts dissolve in water, they break up into positively charged ions (cations) and negatively charged ions (anions). These charged particles can be made to move under the influence of an electric current.

The electrodialysis process utilizes a combination of electric current with ion selective membranes that allow either positive or negative charges to pass through but not both.

An electrodialysis cell consists of layers of alternating anion and cation permeable membranes. When electric current is applied, the positively charged ions (such as sodium) move toward the cathode and pass through the cation permeable membrane. Negatively charged ions (such as chloride) move in the opposite direction toward the anode and pass through the anion-permeable membrane. Water in the center section of each membrane group is thus depleted of salt and becomes potable water.

The Webster plant consists of four membrane stacks with 432 membranes in each stack.

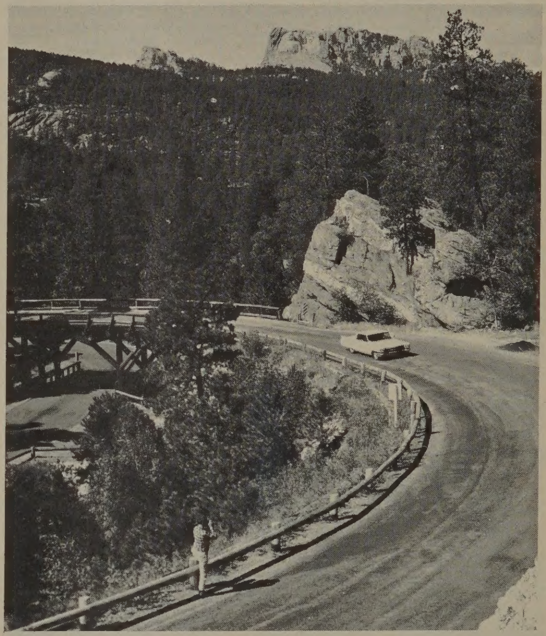
Further information on the Office of Saline Water's activities in South Dakota may be obtained by writing to the Office of Saline Water, U.S. Department of the Interior, Washington, D.C., 20240.

Soil Conservation Service

In South Dakota the Soil Conservation Service of the U.S. Department of Agriculture gives land and water resource conservation assistance to landowners through soil conservation districts which are locally organized under State law and managed by an elected board of unsalaried supervisors. The Service is also participating in a cooperative survey of the James River Basin as part of the program for planning and developing South Dakota's water resources.

Under the Watershed Protection and Flood Prevention Act (Public Law 566), SCS gives technical assistance to watershed projects designed to reduce flood and sedimentation damage to croplands, roads, bridges, and State parks, and to prevent erosion and runoff from upstream lands. The projects are initiated, built, and operated by local people.

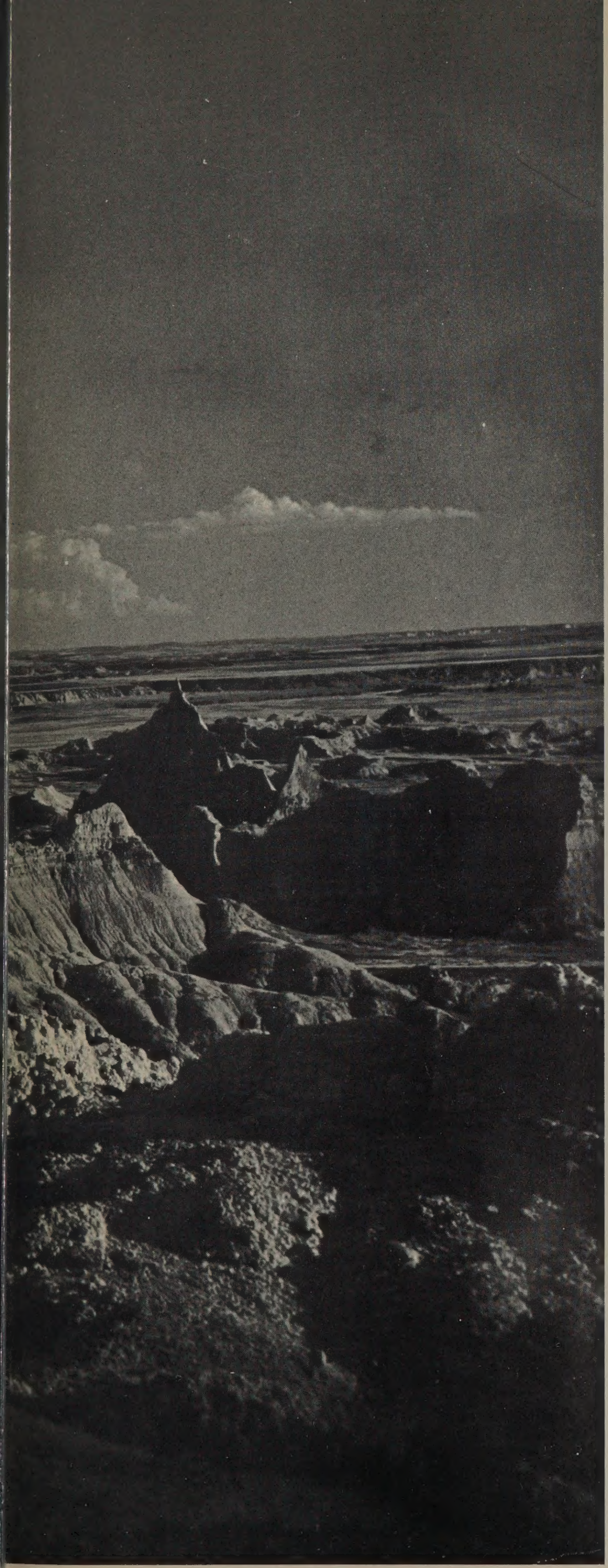
South Dakota landowners benefit from help given by SCS through the Great Plains Conservation Program (P.L. 1021), a program limited to designated counties of the 10 Plains States. The program's objectives are to convert to other uses lands not suited for cultivation and to install conservation practices which will enable landowners to better cope with periodic droughts.



Fertile soil in the eastern portion of the State owes its existence to glacial drift and wise management.

Farmers, ranchers, urban people, and civic groups are working together through a Resource Conservation and Development Project authorized by the Food and Agriculture Act of 1962. The project is designed to protect reservoirs from siltation, increase community income through new recreation developments, and make beneficial adjustments in land use.

Further information may be obtained from the Soil Conservation Service State Office at Christen-Holm Building, 239 Wisconsin Avenue SW., Huron, S. Dak., 57350.



The Future

This awesome land of far-reaching plains, forested hills, and jagged pinnacles and spires meant many things to many people. To the Sioux, the land that was to become the State of South Dakota was sacred; it was survival itself. To the farmer who came to settle, it meant a long and often futile struggle against the forces of nature and the force of Indian hostility. To the adventurer, prospector, and fortune hunter, it meant the lure of gold and a chance of a lifetime.

Some people stayed in South Dakota, some moved father west. The ones that stayed changed South Dakota from a wilderness into a State. The results of their determination and energy can be seen everywhere today: in the prosperous corn and wheat fields, in the thriving dairy herds, and in the dramatic change down the middle of the State where four big dams have turned "Big Muddy" into four brilliant, clear lakes to be used for power, irrigation, and recreation.

It is this sense of spirit and resourcefulness that will help the people of South Dakota plan for the future and the wise use of their rich natural resource heritage. The Federal Natural Resource agencies, in cooperation with local and State agencies, will continue to assist in this effort.

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Acknowledgments

The Department of the Interior gratefully acknowledges the cooperation of the following in supplying illustrations for this publication: U.S. Army Corps of Engineers, p. 24; U.S. Forest Service, Department of Agriculture, pp. 29 (right), 56; Soil Conservation Service, U.S. Department of Agriculture, p. 62 (left); Homestake Mining Company, p. 10; National Geographic Society, pp. 14, 30, 33, 36, 65 (left), inside back cover; Shell Oil Company, p. 43; South Dakota Department of Highways, pp. 15, 19 (bottom), 26, 29 (center), 31, 41, 50, 52, 59 (left), 68, 69, outside back cover.

The Department also expresses its appreciation to the Corps of Engineers, U.S. Department of the Army; Forest Service, U.S. Department of Agriculture; and Soil Conservation Service, U.S. Department of Agriculture, for assisting with the text.

Other Publications of Special Interest

State Natural Resource Series: Washington, Colorado, Montana, Oregon, New Mexico, Idaho (each 50 cents), Arizona, Massachusetts, Ohio, West Virginia, Nevada, Utah, Texas (each 45 cents), California, $.60, Alaska and Wyoming, $.65; Conservation Yearbook Series: "Quest for Quality," $1.00, "The Population Challenge," $1.25, "The Third Wave," $2.00 (all in full color); "Natural Resources Mission to Germany," $.30; "A Primer on Ground Water," $.25; "Has the United States Enough Water?" $2.25; Parks for America," $5.25; "National Park Story in Pictures," $.65; "Federal Assistance in Outdoor Recreation," $.35; "Lake Powell, Jewel of the Colorado," $.75; "Colonials and Patriots," $2.75; "Birds in Our Lives," $9.00; "Ducks at a Distance," $.25; "Waterfowl Tomorrow," $4.00; "Wildlife on the Public Lands," $.35; "The Wolves of Isle Royale," $1.00; "Boundaries of the U.S. and the States," $1.75; "Mineral Facts and Problems," $6.75; "Gem Stones of the U.S.," $.25; "Design of Small Dams," $6.50; Free list of test kitchen series; "Seafood Slimmers," $.25.

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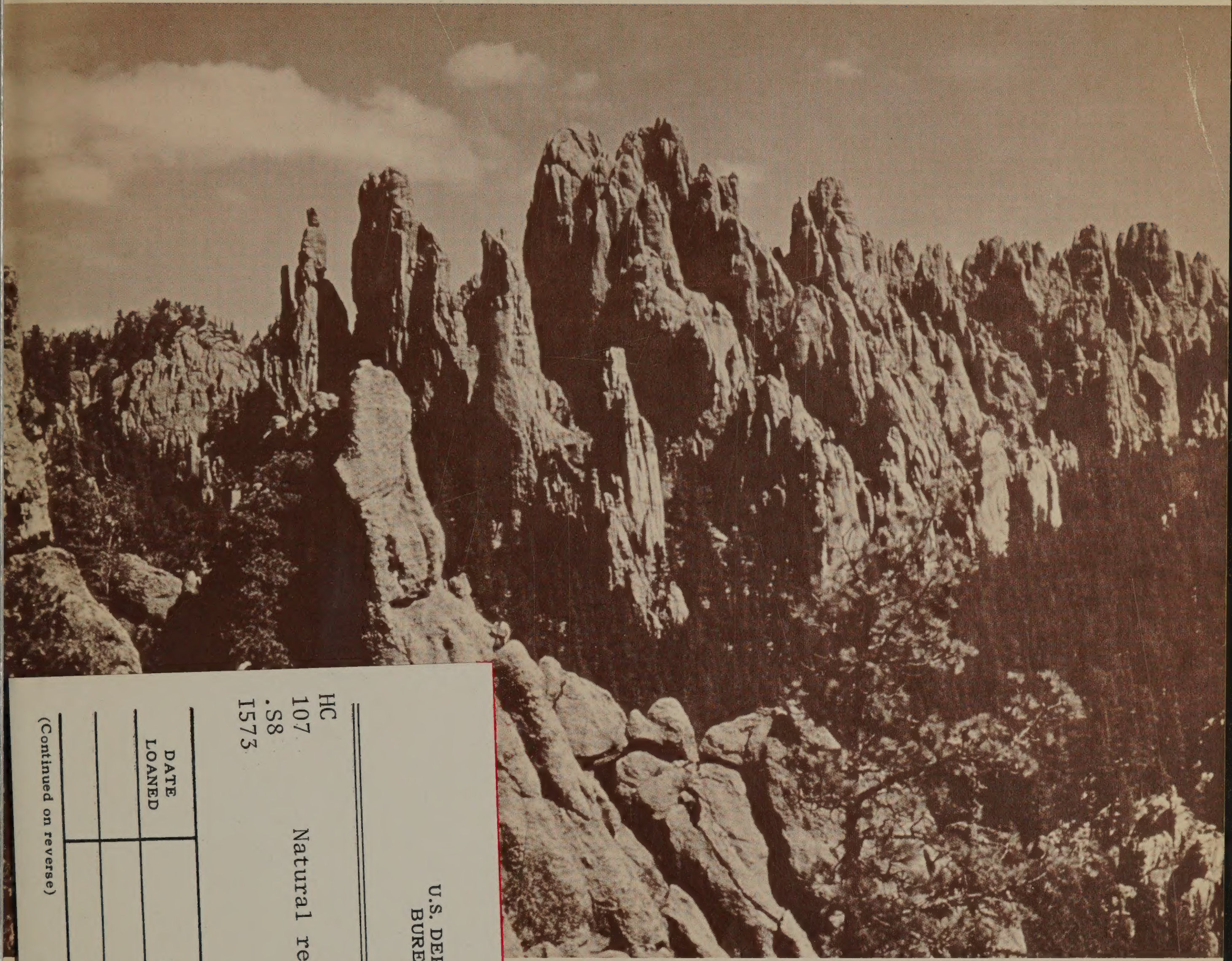

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Natural resources o

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(Continued on reverse)
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(Above) These weathered rocks conceal a chronical that extends back to times far before any recorded history. (Back cover) Roughlock Falls symbolize rugged beauty and water energy, two of the State's vital resources.

STATE OF SOUTH DAKOTA
GREAT SEAL
1889

Created in 1849, the Department of the Interior—a Department of Conservation—is concerned with the management, conservation, and development of the Nation's water, fish, wildlife, mineral, forest, and park and recreational resources. It also has major responsibilities for Indian and Territorial affairs.

As the Nation's principal conservation agency, the Department works to assure that nonrenewable resources are developed and used wisely, that park and recreational resources are conserved for the future, and that renewable resources make their full contribution to the progress, prosperity, and security of the United States—now and in the future.

March 3, 1849